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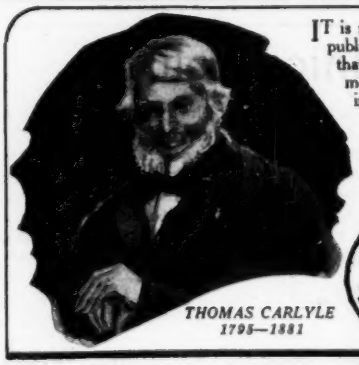

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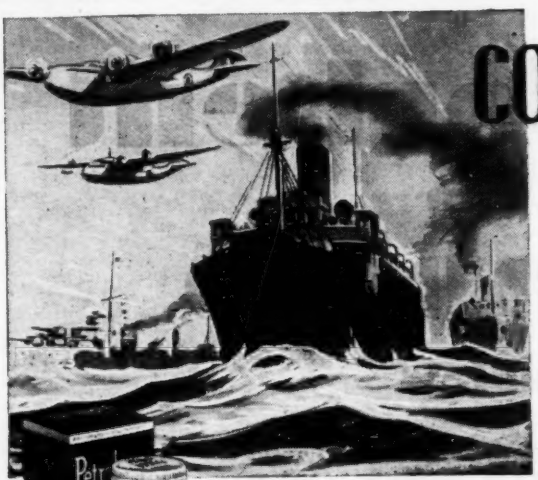

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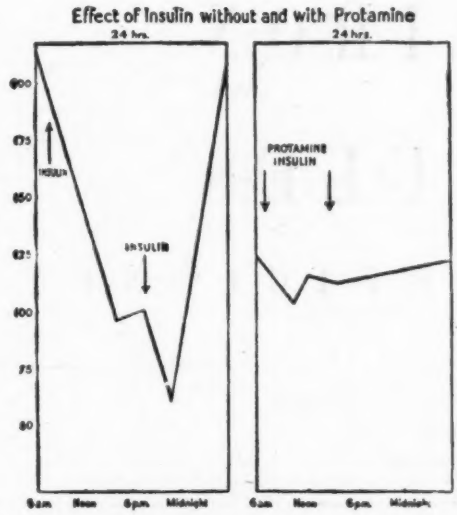

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TIME OF UNION IN FRACTURED TIBIA *

B. H. BURNS
B CHIR CAMB, F R C S
ORTHOPÆDIC SURGEON TO ST. GEORGE'S HOSPITAL

R. H. YOUNG
B CHIR CAMB, F R C S

SURGEONS TO BOTLEY'S PARK ORTHOPÆDIC CENTRE

THERE has been a widespread feeling lately that it takes longer for a fracture of the tibia to unite than it used. From a comparison of cases treated at St. George's 15 years ago and those treated at Botley's Park recently, this appears to be true. The St. George's records are not so full as those of Botley's Park and they are not personal cases. But they do record, with a few exceptions which are of course excluded, the date of removal of the plaster and the start of unprotected weight-bearing. We have been able to analyse, from the St. George's records of 1927–30, 27 cases of closed fracture with an average time of union of 11·5 weeks; and, from the Botley's Park records of 1941–42, 95 cases of closed fracture with an average time of union of 15·5 weeks. (Fractures of the upper and lower ends involving the joints, mere cracks, and fractures in children under 15 are not included.)

The St. George's patients mainly wore back and side splints for the first four weeks, during which time they had massage and the joints were gently moved. Then a plaster cast was applied and the patient was allowed to get about on crutches without weight-bearing until union was firm enough for the plaster to be taken off. The Botley's Park patients were treated mainly by plaster from the beginning, with weight-bearing later.

It is impressive to read extracts like this from the records of fifteen years ago:

"Transverse fracture middle and lower third tibia; back splint four weeks then plaster; union 10½ weeks."

Then suddenly, in the autumn of 1930, we come across two ominous notes:

"Oblique fracture; skeletal traction for 6 weeks then plaster; union 19 weeks."

Transverse fracture; plaster from the beginning; union 17 weeks."

This followed a pilgrimage to Vienna. From that time onwards, instead of 11½ weeks, the average time of union is stepped up to 15½ weeks—in fact, the same time as ours at Botley's Park today. What had gone wrong?

RECENT EXPERIENCE

At Botley's Park we have treated 161 fractures of the tibia during the last two years. Of these, 95 were closed and 66 open. All but 6 fractures have at some stage been treated in plaster. When plaster has been applied at the beginning, we have changed it at about three weeks, when the swelling has subsided. The plasters are applied over a thin layer of wool; the unpadded cast applied direct to the skin has been found less comfortable.

TABLE I—TIME OF UNION IN RECENT CASES OF FRACTURED TIBIA AT BOTLEY'S PARK HOSPITAL

—	Treatment	Type of fracture	No. of cases	Time of union (weeks)
Closed fracture	External fixation. Plaster, or traction with plaster later	Transverse	28	18·6†
		Oblique *	39	14·3
		Total	67	16·1
Open fracture	External fixation. Immediate suture; primary healing	Transverse	8	..
		Oblique	2	..
		Total	10	14·9
Closed fracture	Internal fixation. Transverse plated; oblique screwed	Transverse / Oblique	16	11·3
	Total, all cases		93	15·1†

* "Oblique" includes spiral.
† 2 not included; 1 ununited at 11 months and 1 at 15 months.

The definition of union in a fracture is not precise. We call a fracture united when it has reached a stage at which splintage can finally be removed and full unprotected weight-bearing allowed. The earliest possible moment at which splints can safely be left off is always difficult to decide. In making the decision, X rays are often of little help. They are, of course, decisive if they show the fracture completely joined by bone, but to wait for this would be to retain the splint unnecessarily for many weeks, or even months. Union sufficient to dispense with splintage may be present when the X ray shows but little callus. Clinical tests have been found more helpful. Our procedure has been to accept the union as sound if there is no movement at the fracture site, no pain on attempting forced movement (springing) and the whole weight can be taken on the affected limb without pain. But even these tests are not infallible. In 4 cases where these tests have been satisfied union has subsequently proved to have been unsound.

From the first section of table I it is seen that transverse fractures take longer to unite than oblique and spiral fractures. We have included in this table a small number of open fractures which were sutured immediately and healed by first intention; they united in even shorter time than the closed fractures. As far as one can estimate from the small number of cases, it appears that violation of the sanctity of the hæmatoma has no effect on delaying union.

TABLE II—EFFECT OF EARLY AND LATE WEIGHT-BEARING ON TIME OF UNION IN CLOSED FRACTURES TREATED BY EXTERNAL FIXATION ONLY (APPOSITION APPROXIMATELY EQUAL)

Type of fracture	Treatment	No. of cases	Time of union) (weeks
Transverse	Early weight-bearing (under 6 weeks)	14	14·2
,,	Late weight-bearing (6 weeks or more)	14	23·1*
Oblique	Early weight-bearing (under 6 weeks)	23	11·6
,,	Late weight-bearing (6 weeks or more)	16	18·2

* 2 cases not included (see table I).

Table II surprised us; it shows in a striking way the benefit of early weight-bearing. Late weight-bearing, in some instances, was consequent on attempts being made to improve and maintain the position. Those transverse fractures which bore weight late either came from other hospitals at a late stage or had other lesions, making it necessary for patients to stay in bed. It is noteworthy that in those patients who also had a fracture of the femur, the tibia united much later than the femur. In oblique fractures, weight-bearing at 3–4 weeks is possible in a particularly well-moulded plaster cast with the knee slightly flexed. In spite of some lateral shift appreciable shortening did not occur, except in one case where it was about ¼ in.

TABLE III—DETAILS OF INTERNAL FIXATION

Type of fracture	Treatment	No. of cases	Time of union (weeks)
Oblique	Early screwing; plaster; early weight-bearing	7	9·8
Transverse	Immediate plating; no external fixation; weight-bearing 5 weeks	6	12
,,	Early sliding graft; plaster; early weight-bearing	3	13

Fig. 1 shows an oblique fracture which was allowed to bear weight at 3 weeks. It was taken at the removal of the plaster 11 weeks after injury. No further shortening has occurred (note fracture of upper end of fibula).

In order to correct the lateral shift in an oblique fracture, open operation and fixation by screws has been done in seven instances (fig. 2, *a* and *b*). In all fractures of this type unsuspected cracks were found at operation (see fig. 2*b*), and although these did impede reduction they made firm fixation difficult. It was certainly not possible to dispense with plaster.

* Based on a paper read at the meeting of the British Orthopædic Association in May, 1942.

Table III shows the time of union in closed fractures treated by internal fixation. In the oblique fractures that were screwed the patients walked in 3 weeks and the fractures united in satisfactory time. The few transverse fractures which have been plated and have had no external fixation, being allowed full movement from the start, seemed to be firmly united by bone at 12 weeks. In these plated fractures it is difficult to assess the time of union because they satisfied our clinical tests at about 4 weeks, when they were allowed to walk. In fact, the other day I was alarmed to see a patient, 6 weeks after his injury, jump off his bicycle at the double; he had cycled 16 miles.

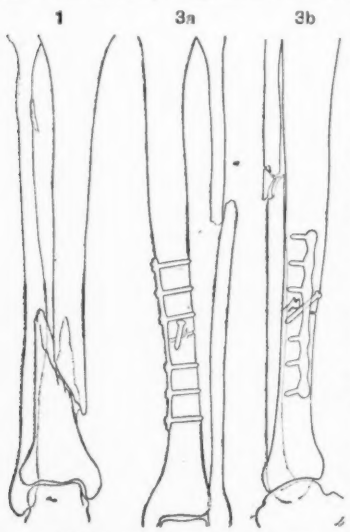

Fig. 1—Oblique fracture at removal of plaster 11 weeks after injury. Walking in plaster had been started at 3 weeks. The displacement is the same as at the beginning and there has been no further shortening. There is a fracture of the fibula near the upper end.

Fig. 3—Transverse fracture. Anteroposterior and lateral views after plating. All screws perforate both cortices.

Fig. 3, *a* and *b*, shows the stability of the fixation. This stability is obtained by using a long plate and inserting the screws through both cortices, and, particularly, by the addition of a cross screw. The cross screw, introduced in Darrach's clinic, is in a plane at right angles to that of the other screws. It does away with the whip you get with the plate alone. We have now done 12 platings without external fixation and the results have been very satisfactory. We were drawn to this method by the observation that so few transverse fractures treated in plaster returned to *full* duty in the Army. It is, perhaps, not surprising that a long time should be taken for full recovery when the average time in plaster was 18 weeks (with 2 non-unions). Even though walking is started early, some stiffness of the foot and some weakness of the muscles is sufficiently common to be a serious drawback. These disadvantages are avoided by dispensing with external fixation. Lane and Tyrrell Gray some time ago omitted external splintages after plating; and lately, in Darrach's clinic in New York, this method with much firmer fixation has been given an extensive and successful trial.

Fig. 2—Oblique fracture with lateral shift. (*a*) Before operation. (*b*) After operation; note many cracks which are not seen in first radiogram; these often only become apparent at operation.

Infected fractures (table IV) are not so easy to analyse, and inferences are more difficult to draw from them on account of varying amounts of sepsis. The chief impression that we have got from the infected fractures is that, no matter how gross the sepsis, union can usually be achieved by prolonged immobilisation in plaster combined with weight-bearing.

TABLE IV—TIME OF UNION IN COMPOUND FRACTURES OF THE TIBIA, TREATED BY PLASTER OR BY TRACTION AND PLASTER LATER

Type of fracture	No. of cases	Time of union (weeks)	Cases not included
Transverse	27	28·7	1 ununited at 14 months 1 ,, when grafted at 10 months 3 mildly septic; grafted at 15 weeks
Oblique	14	20·9	1 grafted at 40 weeks
Comminuted	15	29·7	1 grafted at 16 weeks 1 ,, ,, 20 ,, 1 ,, ,, 39 ,, 1 ,, ,, 52 ,,
Total ..	56	26·4	10

Table V is a list of fractures treated by skeletal traction for more than 4 weeks. It is left in detail because the number in each group is too small for averaging. It includes fractures treated with transfixion pins incorporated in plaster for more than 6 weeks, since this method, although to a less extent, also prevents compression. In each instance the time of union is considerably greater than the average for the corresponding group.

TABLE V—TIME OF UNION IN CASES OF FRACTURED TIBIA TREATED BY PROLONGED SKELETAL TRACTION*

Type of fracture	Method and time of traction (weeks)	Time of union (weeks)
Simple oblique	Two-pin plaster (12)	27
	,, ,, (8)	18
	Traction (4)	20
	Two-pin plaster (8)	24
	Traction; overpulled (6)	22
	Traction (6)	20
Simple transverse	Two-pin plaster (14) Traction (6)	30 — †
Compound oblique	Traction; overpulled (6)	40
	Two-pin plaster (12)	22
	,, ,, (9)	24
Compound transverse	Two-pin plaster (8)	32
	Traction (6)	45
	,, (4)	30
	Two-pin plaster (13)	30
	Traction (8)	50
Compound comminuted	Two-pin plaster (2); traction (9)	—‡
	Two-pin plaster (5); traction (3)	24
	Two-pin plaster (12)	54

* Traction means weight-traction. In two-pin plaster there is one pin on each side of the fracture incorporated in plaster. Apposition was satisfactory in all cases.

† Ununited at 43 weeks. ‡ Ununited at 10 months.

The probable major factors in causing delayed union in the relatively slowest 39 of these reported cases were as follows.

Simple fractures.	Cases	*Compound fractures.*	Cases
Prolonged traction * ..	6	Prolonged traction ..	10
Late weight-bearing ..	5	Late weight-bearing ..	7
Below-knee plaster at 4 weeks	1	Gross sepsis	7
Intact fibula preventing compression	1	Loss of bone	2

* Includes those treated with two transfixion pins and plaster.

CONCLUSIONS

From the Botley's cases we have inferred (1) that early weight-bearing (compression) favours union; (2) that traction, or two transfixion pins, for more than a short time hinders union; and (3) that an open fracture which has been sutured and has healed by first intention unites in a similar time to a closed fracture.

In the cases with which we are concerned the deterioration in the rate of union came about not lately nor gradually, but suddenly in 1930. It was then that we gave up padded wooden splints in the early stages and took to using plaster from the start. Doubtless, the anatomical

results have been better since then, for plaster is more effective in maintaining an insecure reduction. But, in seeking after anatomical perfection, we have paid the price of 4 weeks' delay in union. The main difference between splints and plaster is that immobilisation is much less complete in splints, especially when the side pieces are removed for massage. Is it not possible that the quicker union of those days was due to this very lack of early fixation? A certain amount of movement in the early stages may be a stimulus to callus formation, and the much greater immobilisation that plaster gives may eliminate this stimulus. This seems likely in the long bones, at any rate. The warmest advocates of complete fixation throughout have not been able to dispose satisfactorily of the fact that fractures of the ribs and clavicle unite readily, in spite of considerable movement. Also, we have had no difficulty in obtaining union in fractures of the femur, where early knee movement must produce at least some movement at the fracture site. Apart from other considerations, perhaps the quickest union can be obtained by a combination of splints, with massage and movement in the early stages, and, later, weight-bearing in plaster; but this is speculation.

To sum up: until a method is found of obtaining early union without the danger of sacrificing anatomical reduction we believe that the best treatment is plating, for thus, with no external fixation, and walking at 4 weeks, you get early union with the quickest restoration of function.

Our thanks are due to Mr. J. H. Penrose, registrar at Botley's Park Hospital, and Mr. D. Ebrill, registrar at St. George's Hospital, for their help.

S-METHYLISOTHIOUREA SULPHATE
FOR MAINTAINING BLOOD-PRESSURE IN SPINAL ANÆSTHESIA

F. HORACE SMIRK
MD MANC, FRCP
PROFESSOR OF MEDICINE

MURRAY MCGEORGE
MD NZ, MRCP
SENIOR ASSISTANT, MEDICAL UNIT

UNIVERSITY OF OTAGO, NEW ZEALAND

A NEW pressor substance, S-methylisothiourea sulphate, has recently been introduced,[1] and its effect on the blood-pressure during spinal anæsthesia has now been tried. McGeorge, Sherif and Smirk [2] showed that when injected intravenously in anæsthetised, decerebrate and pithed animals this substance produced a substantial and prolonged rise in blood-pressure, accompanied usually by some slowing of the heart. The blood-pressure rise was still obtained when the motor nerve-endings of the sympathetic had been blocked by ergotoxine or by 1·3-methyl piperidinobenzodioxan (F933). The substance caused contraction of isolated strips of smooth muscle from the intestine, bladder and uterus. The effect on the intestine was diminished, but was not abolished by atropinisation. It seemed, therefore, that the substance stimulated organs containing smooth muscle by a peripheral action, and there was some evidence to suggest that the effect was directly on muscle. It appeared likely that S-methylisothiourea sulphate might prove of value in the treatment of shock unaccompanied by severe reduction of blood-volume. In severe surgical shock, experimentally produced, the substance raised the blood-pressure, and improved the condition of the animals.

Toxicity tests in animals (Smirk, unpublished observations) did not disclose any adverse effects when the substance was administered in therapeutic doses, and in man administration by mouth and by intravenous injection was unaccompanied by any effects other than those which were expected as a result of the pharmacological properties above summarised. Tests were also carried out in dogs to determine whether there was any incompatibility between S-methylisothiourea sulphate and 'Percaine' or 'Stovaine.' Repeated injection of these latter substances in fractional doses to a total just short of a lethal dose did not change the nature of the response to S-methylisothiourea sulphate, and no unexpected effects were observed.

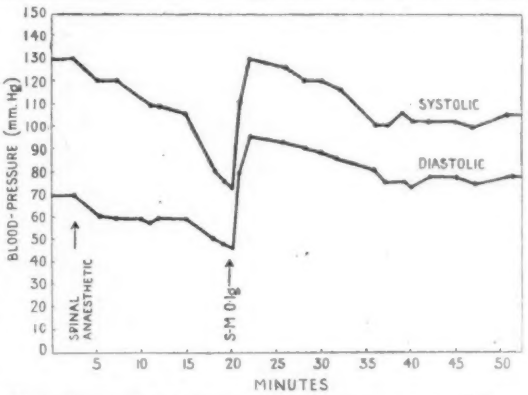

Fig. 1—Response of blood-pressure to one intravenous injection of 0·1 g. of S-methylisothiourea sulphate (S-M) during spinal anæsthesia.

CLINICAL TRIAL

It was decided to try the effect of this substance on the blood-pressure during spinal anæsthesia, and the first occasion on which this was done provided a very real test of its capacity to influence the circulatory system under adverse conditions.

A middle-aged, obese woman, suffering from intestinal obstruction, had received as premedication gr. ¼ of morphine and gr. 1/150 of hyoscine, followed by 1 ml. of ephedrine 30 minutes before the injection of percaine as a spinal anæsthetic. A large gall-stone was found impacted in the lower end of the ileum, and was removed. In spite of intravenous administration of saline and repeated injections of nikethamide and adrenaline, the patient's condition during operation rapidly deteriorated, the systolic blood-pressure falling below 60 mm. Hg. Two and a half hours after the completion of the operation the patient was still in the operating-theatre, unconscious, and too shocked to be moved back to the ward. The blood-pressure was about 70/50. She was then given 0·15 g. of S-methylisothiourea sulphate intravenously, and within two minutes her blood-pressure rose to 108/66, and within five minutes to 115/70. During the subsequent two hours the systolic pressure remained between 100 and 115 mm. Hg, and the patient recovered consciousness and was able to answer questions readily. At the end of three hours, the blood-pressure having fallen gradually to 97/65, a second injection of 0·1 g. was given, with immediate restoration of the pressure to 110/75. During the next twelve hours, a further 1 g. of the substance was given in saline by an intravenous drip, and the pressure did not again fall below 110 mm. The patient made an uninterrupted recovery.

In the course of operations under percaine high spinal anæsthesia, a further 19 patients were treated with S-methylisothiourea sulphate. The method employed was as follows. Apart from gr. ¼ of morphine, no premedication was given to any of these patients. Measurements of the blood-pressure and pulse-rate were made, and the percaine was then injected intrathecally, in appropriate dosage, and with appropriate posturing, to raise the level of anæsthesia to the midthoracic region. Frequent blood-pressure readings taken after percaine administration showed a fall, which in some cases was gradual and in others was quite rapid. As soon as a substantial fall had occurred, 0·05–0·15 g. of S-methylisothiourea sulphate in 10% solution was injected intravenously. This resulted in a sudden rise in the blood-pressure (fig. 1), a peak being reached generally in from two to four minutes. The pressure would then fall gradually, but to a variable extent. In the majority of the cases in which an adequate initial dose had been given, and in the absence of severe operative trauma, the blood-pressure remained at a satisfactory level till the end of the operation (fig. 1). In other cases the blood-pressure was either inadequately raised or inadequately maintained. Where the blood-pressure was inadequately raised this was usually due to the small amount

1. Smirk, F. H. *Brit. med. J.* 1941, ii, 510.
2. McGeorge, M., Sherif, M. and Smirk, F. H., *J. Physiol.* 1942. In the press.

of the substance injected, an expression of caution in the administration of a new drug. In most of the instances where the blood-pressure subsequently fell to any considerable degree this was the result of operative trauma, and further injections were necessary (fig. 2). The response to the later injections was never as well-marked as that following the first injection, but some response was always obtained. In a few cases, where severe operative procedures were in progress, intravenous saline or blood-transfusion was required at a later stage, but not before the pressure had first been elevated and maintained for a considerable period by S-methylisothiourea sulphate alone.

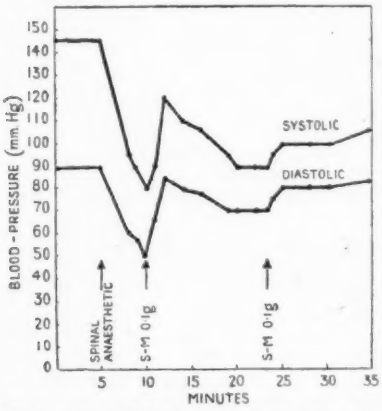

Fig. 2—Response of blood-pressure to repeated intravenous injections of 0·1 g. of S-methylisothiourea.

Although most of these cases received less than 0·25 g., it is possible in the absence of excessive slowing of the heart to give 0·5 g. within a few hours, or 1 g. in twelve hours, as was done in case 1, and in other unpublished cases of shock arising from different causes. Experiments in animals suggest that still larger doses may be employed, but we have no experience of them in man, and in general it seems that when moderate doses fail to elevate the blood-pressure because of adverse circulatory conditions larger doses will be ineffective also. Injection should always be made slowly, over a period of half to one minute, for an occasional patient has suffered slight distress when the substance has been given rapidly, but this has not occurred in the same patient when the injection was given slowly.

DISCUSSION

This study was planned to determine the effect of S-methylisothiourea sulphate on the blood-pressure of patients under high spinal anæsthesia. The technique employed was not the most satisfactory for routine use, since, in order to demonstrate the effect of the substance, the blood-pressure was allowed to fall before the injection was given. The elaboration of a suitable technique was not, however, our immediate concern, but we can state that in every case in which S-methylisothiourea sulphate was employed the blood-pressure was raised (fig. 3). In some instances it rose by as much as 65 mm. Hg, and in 18 out of 20 cases it rose 20 mm. or more. It should be noted that as a rule the drug was given while the pressure was still falling, either as a result of the spinal anæsthetic or through handling of the abdominal viscera. For this reason the rises in pressure recorded are certainly less than the full pharmacological effect which would have been registered had the full extent of the fall from spinal anæsthesia been attained before the pressor drug was given, or if the factor of operative trauma had been absent.

It had previously been noted in animal experiments and in man (Nassif and Smirk, unpublished observations), that the rise in blood-pressure was often accompanied by slowing of the pulse, and slowing was noted in this series of cases. This fall in heart-rate was usually slight, but in three cases there was a drop to about 50 beats per min., and in two to 40 beats. Great slowing may set a limit to the amount of the drug which may be injected at any one time. We intend to ascertain whether this slowing may be partly counteracted by atropine, thus permitting further administration of the substance.

In view of the fact that substances such as ephedrine and lævo-α-hydroxy-β-methylamino-3-hydroxyethylbenzene hydrochloride ('Neosynephrine') are commonly employed in spinal anæsthesia, it was desirable to know if any incompatibility existed between these substances and S-methylisothiourea sulphate. It has been demonstrated (Fastier and Smirk, unpublished observations) that the administration of S-methylisothiourea sulphate in the cat and dog renders these animals more sensitive to the pressor action of adrenaline. On account of its practical and theoretical interest, therefore, the effect of S-methylisothiourea sulphate on the pressor action of other sympathomimetic amines was studied. It was found that this substance and neosynephrine acted synergistically in respect of their pressor activities, and that a lesser degree of synergism also existed between it and ephedrine. In a few instances our clinical observations suggest the possibility that in man also the combined effect of S-methylisothiourea sulphate with either neosynephrine or ephedrine is greater than the sum of their separate effects. It seems, therefore, that this substance deserves further consideration as a pressor agent, to be held in reserve for use in cases where the administration of ephedrine or neosynephrine has given an inadequate response; and particularly if the synergism observed in animals and in our preliminary observations in man is confirmed. So far as our observations go it appears that S-methylisothiourea sulphate would also deserve a trial as a routine pressor agent if the difficulties attendant on its intravenous administration were overcome.

As our experience is limited to 20 cases, we cannot express any opinion as to its merits when compared with ephedrine or neosynephrine, and it must be fully recognised that the use of the drug is at present in an experimental stage. Our limited clinical experience is unlikely to have brought us in contact with all its potential risks. We have evidence from other work that it is unsuitable in congestive heart-failure, and we have, on theoretical grounds, avoided its use also in cases of coronary disease, hypertension and thyrotoxicosis. Experiments in animals suggest that it is a safe substance, and experience in about 100 patients and normal subjects has not provided us as yet with any evidence against this, except in congestive heart-failure, where 2 patients experienced breathlessness of a few hours' duration after its use. Quantities of as much as 0·8 g. have been taken by mouth on several occasions by normal subjects (Nassif and Smirk, unpublished observations) without ill effect or the development of any symptoms.

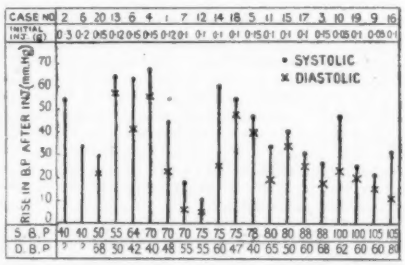

Fig. 3—Synopsis of blood-pressure responses to initial intravenous injection of S-methylisothiourea.

Since we do not intend to go further with the detailed study of the technique in spinal anæsthesia, we present for what they are worth a few preliminary ideas which may be of service to anyone who desires to make a practical trial of the substance. S-methyliosthiourea sulphate is a relatively simple substance, which may be prepared readily in the laboratory and can be purchased commercially.[3] We do not know anything concerning the purity of commercial samples. We have employed the substance in a 10% aqueous solution placed in ampoules of 2 ml. each, which were sterilised by tyndallisation. This solution is definitely acid and apparently does not decompose to any appreciable extent. If, however, the solution is rendered alkaline it begins to decompose at a pH of about 9, liberating the powerfully smelling substance methyl mercaptan. An odour somewhat similar to that of methyl mercaptan is noticed

3. It can be obtained in Great Britain from Messrs. British Drug Houses.

when ampoules of the unneutralised S-methylisothiourea sulphate are opened; the odour is detectable in the atmosphere in a concentration of about 1 part in 10^{14}. We were unable to detect the presence of mercaptans chemically. Some ampoules were tested after six months and were apparently unaltered. Because of its acidity this solution is irritant when injected subcutaneously, and up to the present we have only used it intravenously, or, in other investigations, by mouth. We are now conducting observations with a solution adjusted to pH 6, with the object of discovering whether injections may be given intramuscularly.

Our practice of allowing the blood-pressure to fall before the administration of the pressor agent is obviously not to be employed as a routine, for when the blood-pressure has fallen there may be difficulty with intravenous injections if the veins become collapsed and empty. In some cases this was obviated by arranging a slow intravenous drip at the beginning of the operation, and the additional control over the blood-pressure thus secured proved this a valuable feature in facilitating prompt injection.

In a preliminary note [1] the trial of this substance in shock following injury has been advocated in cases where restoration of the blood-volume has not proved effective, or where circumstances are likely to delay such restoration. We feel that the demonstration of its action in circulatory shock induced by spinal anæsthesia provides evidence that the substance is worthy of further trial in such cases. But we would reiterate our view that it is not to be employed as a substitute for the restoration of diminished blood-volume when this is a practical procedure.

SUMMARY

S-methylisothiourea sulphate raises the blood-pressure when this has been depressed by spinal anæsthesia.

A further clinical trial of this substance appears warranted.

We wish to thank Mr. F. Gordon Bell and Mr. J. A. Jenkins, surgeons to the Dunedin Hospital, and Dr. Marion Whyte and Dr. J. R. Ritchie, anæsthetists, for their coöperation. We are indebted to Prof. E. F. D'Ath for his help in the preservation of sterile solutions of the substance.

THE LOW-PRESSURE PHASE OF BLAST

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PREVIOUS investigators have attached much significance to the high-pressure component of the blast wave as the cause of blast lesions (Zuckerman 1940). The low-pressure phase has been somewhat neglected, and has not been regarded as a factor which can be primarily responsible for the production of lesions. Zuckerman, however, has suggested that this phase may aggravate the injuries already produced by the high-pressure component. The present experiments were carried out to determine the effects, if any, of exposure to low pressures of exceedingly short duration. Mice were used as experimental animals.

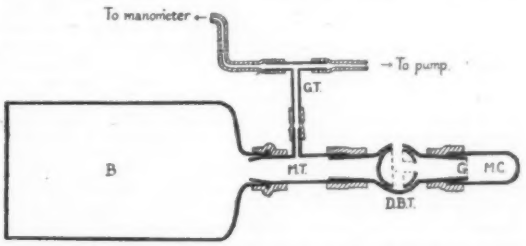
EXPERIMENTAL PROCEDURE AND FINDINGS

The apparatus used is illustrated in the figure. The mouse was placed in the thick-walled glass mouse chamber, MC, which was then connected to the tap DBT by means of a thick rubber connexion. The wide three-way bore of the tap was initially in the position indicated in the diagram by interrupted lines. The mouse was therefore breathing room air. Bottle B was evacuated as completely as possible by means of the 'Hi-vac' pump, which was kept running throughout the experiment. Tap DBT was now rapidly turned through 90°, in a clockwise direction, and then just as rapidly returned to its original position. This momentarily placed the small mouse chamber in communication with the large evacuated bottle and then returned it to its original connexion with room air. The gauze G prevented the mouse from being sucked into the tap.

Death occurred instantaneously, or after a short interval, in approximately half the animals exposed in this manner. Post-mortem examination of the lungs always revealed hæmorrhagic areas, which were not as a rule symmetrically distributed. Occasionally, other hæmorrhagic lesions, both intra- and extra-thoracic, were produced. Such lesions have been found in the pericardium, thymus, liver, large intestine, pancreas and fallopian tubes. They illustrate the fact that extrathoracic lesions produced by blast cannot be brought forward as evidence in favour of the high-pressure component being the injurious factor.

The following three descriptions of fatalities give a more or less complete picture of the different types of fatal reaction observed.

ANIMAL 8.—Death instantaneous. *Autopsy.* The lungs showed numerous hæmorrhagic areas, not symmetrical in their distribution; some of these areas appeared to be along the lines of ribs. Blood-stained froth was present in the trachea and bronchi. There were a few small subserous hæmorrhages in the large intestine.



Experimental apparatus used: B, Glass bottle of 8 litres capacity; DBT, metal tap (Douglas bag type); G, gauze protection; GT, glass T-piece; MC, glass mouse-chamber; MT, metal T-piece.

ANIMAL 18.—Death instantaneous. *Autopsy.* The typical lung lesions were present as well as hæmorrhages into the pericardium and thymus. Extrathoracic hæmorrhages were also present in the liver, pancreas, pyloric region and large intestine. The cæcum was greatly distended with blood. The mesentery seemed abnormally congested.

ANIMAL 9.—Death after a few minutes, preceded by paralysis of the hind limbs, tachypnœa and orthopnœa, the appearance of blood-stained froth at the mouth and nose, and finally convulsions. *Autopsy.* Patchy hæmorrhages in the lungs and blood-stained froth in the trachea and bronchi. Intercostal hæmorrhages were also present. Small subserous hæmorrhages were seen in the pyloric stomach and a few in the large intestine.

As in the case of true blast, the lung hæmorrhages, associated with instantaneous or rapid death, vary very much from animal to animal. They tended to be greatest in those animals which survived for a short period. In one case, in which death occurred after twenty minutes, the lungs were almost completely hepatised.

Animals which recovered completely were killed with coal gas at varying intervals after exposure. In this way the recovery process could be studied. It was found to be more or less identical with previous descriptions, even to the occurrence of greyish patches in the midst of hæmorrhagic areas, described in human cases (Hadfield 1941). These areas showed pseudopneumonic mononuclear infiltration. In sections stained with hæmatoxylin and eosin collapse of the alveoli rather clouded this picture. The mononuclear infiltration was, however, beautifully demonstrated by using McGregor's azan-carmine stain (McGregor 1929). These animals which recovered often showed lesions which were unilateral or affected only one or two lobes. This illustrates the danger of inferring that the occurrence of unilateral lesions, in animals exposed to the blast of explosions, indicates that blast lesions are necessarily produced by the high-pressure phase.

DISCUSSION

Exposure to a rapidly produced low pressure of very short duration is thus capable of producing injuries similar to those produced by blast. One may infer from this that the low-pressure phase of blast may possibly

have an importance greater than that previously attributed to it. It may be argued that the period of exposure to low pressures in these experiments has been greater than in true blast. In order to overcome this criticism an apparatus has been devised in which mice can be exposed to known pressures, high or low, for measurable periods corresponding to those of blast. Nevertheless, it is felt that even with the present apparatus the period of exposure to low pressures is exceedingly short and probably of the same order as that of blast.

What is the mechanism whereby this short exposure to low pressure produces lesions? In this communication the lung lesions only will be considered. Blast injuries of the lungs bear some resemblance to the injuries that occasionally occur with the Davis escape apparatus. The submarine fatalities are known to be caused by over-inflation due to the fact that the pressure of air in the lungs is greater than that of the surrounding atmosphere. In the case of blast such a pressure difference might be achieved in two ways. One possibility is that the lungs are over-inflated by the high-pressure component passing directly down the bronchial tree. That this does not occur is adequately demonstrated by the findings of Zuckerman and his co-workers (1942). The second possibility is rather more subtle. It depends on the assumption that the pressure changes of blast are not directly communicated to the inside of the lung. This is borne out by the relative narrowness of the trachea and the exceedingly short duration of the blast wave. If this state of affairs holds good, then the intrapulmonary pressure would be greater than the outside pressure during the low-pressure phase of blast. The large area of body surface would make this pressure difference very effective. The resulting over-inflation of the lungs would tear some of the pulmonary capillaries and so produce the hæmorrhagic lesions; hence the lesions of the experiments just described.

The lung bleeding of blast injuries continues for quite long periods. This can be explained by a similar mechanism of tearing of the capillaries. In this case, not by pressure differences but by the lung movements causing a pull on the fibrin strands produced by coagulation and early organisation. This suggestion obviously has an important bearing on treatment. One might suggest immobilising the chest with bandage as well as the inhalation of pure oxygen.

It seems possible that the lung lesions of blast are primarily due to over-stretching of the lung substance (1) during the low-pressure phase, by the mechanism already indicated, and (2) at the end of the high-pressure phase, by the elastic recoil of the thoracic wall occurring after compression. These factors would tend to be additive. As far as can be ascertained from published work this suggestion has not previously been made. It would indicate a method of preventing blast injuries of the lung. Over-inflation should not occur if the chest is covered with a tight inelastic bandage or jacket.

SUMMARY

Mice have been exposed to sudden low pressures of short duration.

Approximately half the animals died instantly or within a short period.

Typical blast lesions were produced, both intra- and extra-thoracic.

In the treatment of blast injuries of the lung immobilisation of the chest with a bandage might prevent further bleeding into the lung.

Covering the chest with a tight bandage or jacket should help to prevent blast injury by checking over-stretching of the lung substance.

I wish to thank Prof. H. E. Roaf, in whose department this work is being carried out, as well as Prof. T. B. Davie and Dr. C. V. Harrison, of the department of pathology, for criticism and advice.

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REACTION OF THE BLOOD LYMPHOCYTES TO TRAUMA AND HEALING

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IT was recorded by Erf (1940) that when the stomach, intestines, spleen, pancreas and mesenteric lymph-nodes were removed from rabbits a severe and persistent lymphopenia developed within 2 hours of the operation and was not relieved by the administration of lymphocytes intravenously. After the operation the rabbits recovered from the anæsthetic and were able to hop about; they lived from 8 to 24 hours. These experiments were carried out to test the suggestion by Bunting and Huston (1921) that lymphocytes escaped from the circulation by migrating through the mucous membrane of the alimentary canal. Erf's results did not support the idea that such migration took place, though it has since been confirmed (Sanders, Florey and Barnes 1940) that very large numbers of lymphocytes must disappear from the circulation daily. On the contrary Erf's results suggest that the gut, spleen and mesenteric nodes are the main source of the blood lymphocytes.

Yoffey (1942), also testing the suggestion of Bunting and Huston, removed the greater part of the small and large intestines in 15 dogs. Within 2–3 hours there was no constant change in the blood lymphocytes. Of the 15 dogs, 6 showed a fall in their lymphocytes, 6 a rise and 3 no change. There was always a considerable increase in the polymorphonuclears, and the red cells showed little change. Sanders, Florey and Barnes (1940) noted that the blood picture was considerably altered by operations other than removal of the gut. They gave the following figures for the changes in the blood lymphocytes produced by drastic operative procedures on cats.

Operation	*Lymphos. per c.mm. of blood* Before op.	6 *hr. later*
Decerebration with exposure of colon	7200	810
	6600	1100
Decapitation and collection of intestinal secretions	5100	2200
	6300	4800

The following experiments were carried out on albino rats, using the counting methods described elsewhere (Cruickshank 1941).

Removal of the stomach, small intestine, colon, mesenteric lymph-nodes and spleen.—The operation was performed under 'Nembutal' and ether; after it the rat was always kept quiet with nembutal until it died. Effects on the blood lymphocytes are shown in table I (rats 1–5). All showed a considerable fall in their blood lymphocytes. There were no notable changes in the red-cell counts. The results of removing parts of the alimentary canal are shown in the same table (rats 6–12). All these animals showed a diminution of lymphocytes at some stage of the experiment. It will be noted that in some, towards the end of the experiment, there was a tendency for the lymphocytes to rise again. This was conspicuous in rat 10 where there was only a slight fall followed by a fairly decided rise.

It was usually found that the fall of the lymphocytes was gradual and reached a maximum in about 24 hours. Immediately after the operation there was little change in the lymphocytes as can be seen from the two following experimental operations.

Rat A

Immediately before gastrectomy, 8064 lymphocytes per c.mm.
,, after ,, 8171 ,, ,, ,,

Rat B

Immediately before gastrectomy 8102 lymphocytes per c.mm.
,, after ,, 8060 ,, ,, ,,

Anæsthesia alone caused no fall.

Operations unconnected with the alimentary canal.—All the experiments so far had had some connexion with the alimentary canal (even those of Sanders, Florey and Barnes). The results obtained after decerebration in rat 13 and after wounds of the skin (made by the method of Young, Fisher and Young 1941) in rabbits 1, 2 and 3 are shown in table I. In rabbit 3 the lymphocytes were found to be higher the day after the operation than they had been originally, but in all the other experiments there was a fall.

TABLE I—LEUCOCYTES PER C.MM. BEFORE AND AFTER OPERATIONS IN ANIMALS

Animal	Operation	Before opn.		After opn.		
		Lymph.	Poly.	Time since opn. (hr.)	Lymph.	Poly.
Rat 1	Removal of gastro-intestinal canal	7354	912*	5	1063	2037
2		9418	1332†	3	1774	786
3		6470	1584*	5½	3057	4795
4		9211	1041†	1	5256	2744
				2½	3689	4111
5		7070	2058†	6	467	3333
				10	942	2458
Rat 6	Gastrectomy	14,795	2153	5	9788	13,912
				12	5899	19,731
				14	8364	14,676
7	Enterectomy	8887	2853	1	12,264	4536
				6	11,915	5685
				12	7186	10,214
				14	7667	11,033
8	Colectomy	7416	2884	7	6963	14,797
				12	5995	15,965
9	Gastrectomy	7843	2530*	8	4545	11,515
				21	1353	10,947
				24	1632	7968
10	Entero-colectomy	7366	3954*	6	6184	10,666
				11	8258	18,642
				20	9625	21,125
				24	10,952	23,598
11	Gastrectomy	7069	1784*	7	7035	13,065
				11	4421	11,376
				13	2246	6394
				20	3876	6244
				24	2458	3642
12	Entero-colectomy	8593	3227	6	4426	11,376
				21	612	2448
				24	952	2448
Rat 13	Decerebration	8080	1240	1	9397	3353
				5½	5060	5060
				12	4129	7771
				23	5037	5843
				27	3658	6502
Rabbit 1	Skin wounds	9319	2954	24	5505	845
2	,, ,,	2925	1499	24	2760	680
3	,, ,,	5098	2662	24	7165	1365

* Average of 3 counts. † Average of 4 counts.

Human observations.—Patients who underwent various operations were then investigated and the effects of their operations on their blood lymphocytes are shown in table II. Of the 27 cases, 22 showed some fall in the blood lymphocytes. The fall was greatest after severe operations in patients who had had a lymphocytosis before operation. Of the 5 which showed an increase in the lymphocytes the operation involved little trauma in cases 23, 24 and 25. In case 26 a transfusion of several pints of blood had been given. In case 27 the amputation of the leg was carried out because of gangrene from thrombosis in an arteriosclerotic artery, and the low level of the lymphocytes before the operation suggests that the onset of the gangrene had had an effect similar to that of an operation involving trauma to tissue.

TABLE II—LYMPHOCYTES PER C.MM. BEFORE AND AFTER OPERATION IN HUMAN PATIENTS

Case	Age and sex	Operation	Lymphocytes	
			Before	After 24 hr.
1	66 M	Removal of splenic flexure	2011	394
2	56 M	Removal of sigmoid colon	1464	725
3	52 M	Partial gastrectomy	3038	624
4	47 F	,, ,,	2563	1070
5	30 M	Gastro-enterostomy	2670	1283
6	49 F	Nephrectomy	2205	1344
7	37 F	Colostomy	2425	1242
8	13 M	Curettage of neck lymph-glands	2957	2633
9	26 F	Appendicectomy	2360	1607
10	49 M	Partial gastrectomy	5652	1441
11	73 F	2nd stage Paul-Miculicz	2296	1204
12	41 M	Partial gastrectomy	2187	631
13	16 M	Repair of hernia	2240	1520
14	36 F	Cholecystectomy and appendicectomy	2822	1140
15	81 M	Prostatectomy	2085	1311
16	38 M	Block dissection of neck lymph-glands	3761	1846
17	38 M	Partial gastrectomy	5563	1155
18	35 M	Gastro-enterostomy	2035	648
19	68 M	Prostatectomy	1870	1360
20	44 F	Nephro-ureterectomy	1311	896
21	46 F	Local mastectomy	1550	1131
22	64 F	Cystotomy (inoperable carcinoma)	1645	944
23	69 M	Colostomy	1288	2402
24	54 M	,,	1019	1623
25	26 M	Pinning of os calcis	1436	1943
26	42 F	Excision of rectum (transfusion)	2731	3697
27	45 M	Amputation of leg for gangrene	781	819

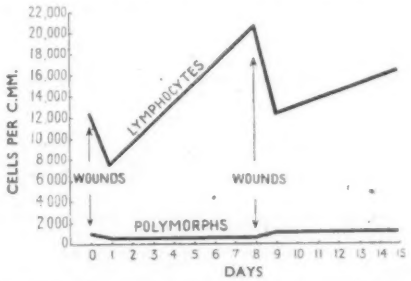

Fig. 1.—Effect on leucocyte count of second skin wounds in a rat during healing of the first. The polymorphs were unusually few in this animal, but the lymphocytes show a well-marked response to the wounds.

Animal experiments with recovery.—As stated, in some of the animals which lived for 24 hours or more the lymphocytes showed a tendency to rise towards the end of the experiment (e.g., rat 10). In animals which had received wounds, and where the wounds were allowed to heal, a decided lymphocytosis followed the initial fall. The average figures in 6 rabbits were:

	Before operation	*After operation:* 1 *day*	10 *days*
Lymphocytes	5350	3683	8767
Polymorphs	3950	3333	5850

And in 6 rats:

	Before operation	*After* 1 *day*	*After operation:* 7 *days*	12 *days*
Lymphocytes	7567	5667	12,050	12,817
Polymorphs	2983	1067	3583	2200

The effect of a second series of skin wounds inflicted during the healing of primary wounds in a rat is shown in fig. 1.

Effects of infection.—No such lymphocytosis was noted when 5 rats which had been injected subcutaneously with staphylococci in doses sufficient to produce abscesses had blood-counts done at corresponding times. In these animals the lymphocytes fell after the injection and remained somewhat below the original level as the abscess ran its course:

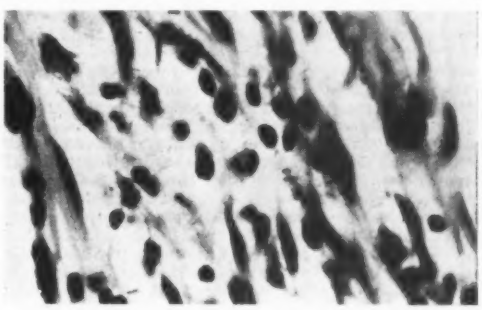

Fig. 2.—Cells indistinguishable from lymphocytes among fibroblasts in healing wounds.

	Before injection	*After injection:* 1 *day*	4 *days*	10 *days*
Lymphocytes	7780	6920	5540	5425
Polymorphs	2460	4380	2740	2425

DISCUSSION

From the results of these experiments it seems that the effect of an operation inflicting much trauma or loss of tissue is to cause a fall in the blood lymphocytes. When healing is taking place the blood shows a lymphocytosis. These findings suggest that the lymphocyte plays an important part in healing and support the view that it can undergo transformation into other types of cell. It is suggested that when tissue has been removed lympho-

cytes accumulate in the region of the loss, in the course of the first 24 hours, and as a result the blood lymphocytes fall. The need for lymphocytes is met by increased output from the lymphatic tissue and a lymphocytosis in the blood follows. This suggestion receives some support from the presence of considerable numbers of cells, histologically indistinguishable from lymphocytes, among the fibroblasts of the healing wounds (fig. 2), and Maximow (1928) claims to have observed the transformation of lymphocytes into fibroblasts in tissue culture.

SUMMARY

After severe operations in animals (e.g., removal of the whole or part of the alimentary canal, decerebration, wounds of skin) the blood lymphocytes were found to fall within a few hours.

In 27 human subjects lymphocyte counts were done before, and 24 hours after, various operations; 22 showed a fall in their blood lymphocytes after the operation.

In rabbits and rats there was found to be a blood lymphocytosis during the healing of wounds of the skin.

These findings seem to support the view that lymphocytes may undergo transformation into other types of cell —for example, into fibroblasts.

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BLOOD-TRANSFUSION NEEDLE

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AT the inception of the local transfusion services, the need for an adequate supply of sharpened needles became apparent. We had to sharpen our own needles and for this purpose a small arkansas stone with a rounded top roughly fitting the bevel of the needle was used. It was found with some needles that the point could easily be introduced into the vein, while others would either stick when going through the skin or "buttonhole" the vein. A search was made in the published work for guidance as to the shape and size of the bevel of the needle.

Riddell [1] states that "The end of the needle should not be too pointed or it will tear or perforate the posterior wall of the vein. In other words, the bevel should be short though it should have well-cared-for cutting edges. It is of no consequence whether the bevel faces upwards or downwards as long as it is sharp." French [2] in 1912 described the use of a hollow needle of large bore for the removal of blood; he gives the length as 2–4 cm. and diameter as 2 mm., but does not make any comment on the point. In 1927 [3] he illustrated what has since been called French's needle and states that by sharpening the back he produces a triangular point which will enter the skin more easily. His illustration shows a needle with a flat bevel 8 mm. long. A needle with a flat bevel seems to have the disadvantage of occupying too great a volume inside the vein and thus of slowing the flow of blood.

ESSENTIALS OF THE POINT AND BEVEL

This investigation was undertaken with the idea of standardising the specification of the bevel of a transfusion needle so that each point could be assessed separately. Examination of new needles with a magnifying glass (× 10) showed that they were for the most part very rough in their finish and quite a few were blunt. It is unwise to assume a new needle to be fit for use. A set of small emery grindstones were fitted to a dentist's mandrel. The mandrel was held in a special chuck and the whole was driven by means of a Singer sewing machine electric motor, controlled by foot. Experience showed that the grindstone should have a diameter of between 18 and 22 mm. Two stones were used, one coarse and one fine. A hard rubber buff was used for polishing the bevel and removing the feathered edges. By using hard rubber instead of soft rubber with emery compound it was possible to avoid finishing off by hand on an oil stone.

By a tedious process of trial and error the following facts were established.

1. If the bevel is too short, or represents the arc of too small a circle, there is difficulty in pushing the needle through the skin and the consequent jerk is liable to buttonhole the vein. For a needle with an external diameter of 2 mm., the bevel should represent an arc of a circle of 19–22 mm. The tangent of this circle at the point of the needle should lie parallel to the back of the needle. If the bevel is too short the vein may be split and quite a large hæmatoma formed.

2. If the shoulder of the needle is not rounded off the needle again tends to go through the skin with a jerk.

3. The point must be sharp otherwise it fails to engage the wall of the vein and produces clumsiness in technique.

4. The cutting edge at the sides of the needle must extend up the side of the bevel just so far as is necessary to make the cut in the skin large enough to admit the needle. Failure to sharpen the cutting edge causes the needle to stick first in the skin and then in the vein wall. Thus, though a needle may look perfect to the naked eye and have a very sharp point it may in fact be practically impossible to make it cut through the skin. The cutting edge must be undercut just sufficient for sharpness but not so much that it is difficult to make a smooth yet keen edge. The sharpness of this edge is one of the most important features of a needle; it ensures a clean cut into the skin, without tearing or stretching of the skin and vein wall. Other things being equal this factor bears directly on the rate of healing.

5. The aperture in the bevel should have rounded edges. The existence of sharp serrations which can catch in either the skin or the vein wall is one of the most potent sources of trouble in venepuncture.

If all these considerations are attended to extremely little pressure will be needed for introducing the needle into the vein; with such a needle extremely few people will be found to have veins from which blood cannot be obtained without the use of suction.

For whatever purpose a needle may be used—intradermal work, anæsthesia of the periosteum for sternal puncture, simple hypodermic inoculation or the like—there is an optimal shape for the bevel and point which can be worked out. A standard specification for the point and bevel of any needle would be a great advantage both to the doctor and the manufacturer and the following form is suggested.

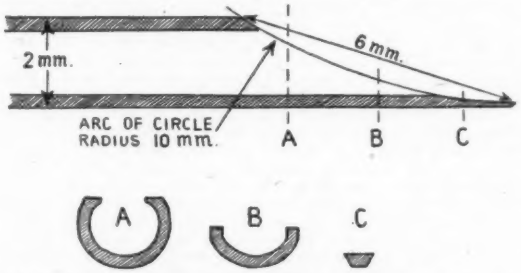
1. *Specification of Steel Tubing Used.*
2. *Diameter of the Bevel.*—This term would refer to the diameter of the circle of which the bevel forms an arc.
3. *Angle of the Bevel.*—The angle between the tangent of the bevel at the point of the needle and the line of the back of the needle, representing the back of the needle.
4. *Angle of the Point.*—The angle made by the two sides of the bevel where they meet to form the point of the needle.
5. *Shoulder.*—It should be stated whether or not the shoulder is to be rounded off.

On this scheme here is a specification for a taking needle: steel tubing 2 mm. diameter; bevel diameter 22 mm.; angle of bevel 0°; angle of point 40°; shoulder rounded off. And here is one for an intradermal needle: steel tubing 27 s.w.g.; bevel diameter 10 mm.; angle of bevel 35°; angle of point 60°; shoulder not rounded off (the shoulder is left in this case in order that the needle may be impeded in its passage through the skin).

THE BORE

Examination of needles under the magnifying glass shows the almost incredible roughness of the bore, and steel-tube manufacturers say that this roughness cannot be avoided. It is impossible to clean all the blood and dirt from the crevices in the inner wall of a standard needle. Accordingly, needles were polished by spinning them at high speed and introducing a steel knitting-needle (size 17) through the bore, covering the knitting-needle first with a coarse valve-grinding paste, then with a fine grinding paste (polishing paste), and finally with either 'Diamantine' or chromium sesquioxide suspended in spirit. The needle was cleaned out with

1. Riddell, V. Blood Transfusion, 1939, London, p. 244.
2. French, H. *Guy's Hosp. Rep.* 1912, **66**, 338.
3. *Proc. R. Soc. Med.* 1927, **20**, 1558.



Above, longitudinal section through needle showing the arc of circle making the bevel whose angle is 0°.
Below, cross-sections of needle showing the formation of cutting edges.

darning wool and trichlorethylene or acetone between each of these operations. The rate of flow of blood through a needle treated in this way appeared to be increased by about 25%. At the same time the tendency to clot was greatly diminished and it was noticeable that blood usually flowed just as quickly at the end of the operation as at the beginning. Once the bore is polished cleaning becomes much simpler, and the occasional use of diamantine or chromium sesquioxide will maintain a first-rate finish.

METHOD OF GRINDING NEEDLES

Two circular stones, each mounted on its own mandrel (diameter 22 mm.), one medium or medium fine and the other coarse grit; personally, I use a "green emery" wheel.

A hard rubber buff or other finishing buff. Here I use a very hard rubber impregnated with graphite. This wheel must also be of 22 mm. diameter and mounted on its own mandrel.

A riffler. This is a small cutting tool not unlike a file, cone shaped and mounted on a shaft of the same size as the mandrel carrying the grinding stones.

A small polishing lathe driven by an electric motor, preferably of ¼ horse-power. This motor must be foot-controlled and capable of large variations in speed. The polishing lathe consists of a spindle mounted on bearings with a driving belt at one end or in the centre and a small chuck attached to the spindle which will grip the mandrels or the riffler. If this spindle and chuck is hollow right through it can be used for holding the needle and polishing its bore as well. Great care must be taken under these circumstances that flying grit does not get into the bearings.

Both grindstones and polishing wheels must be trued up before use. This is best done with an industrial diamond mounted for the purpose, but can be satisfactorily done with the edge of an ordinary wheel glass-cutter. The grinding wheel is spun at its maximum speed. The diamond or glass cutter is thus passed gently backwards and forwards across the wheel until all irregularities have been removed and the wheel is dead centre. However lightly a needle is allowed to rest against the wheel it should never bounce or chatter even when the wheel is at maximum speed.

Unless a complete new bevel is to be made it is not necessary to use the coarse grinding wheel. The needle is placed against the stone so that the bevel fits roughly against the circumference of the stone. The motor is then started, at first very slowly and then accelerated up to about 8000–10,000 revolutions per minute. This will produce an excessive amount of heat which must be dissipated by a continuous drip of water on the stone. Where the angle of the bevel is too great and it is therefore desired to move the bevel up the shaft of the needle a slight pressure in an upward direction will do this. When the point is too thick the pressure must not be upwards but forwards. By a combination of pressures upwards and forwards it is not difficult to set any bevel. Once set, the edges must be brought together to a point by using the side of the stone and moving the needle in a combined twisting and circular movement so as to produce a cutting edge as shown in the figure. It is best to put the rounded shoulder on to the needle after the point has been made. At this stage a lot of sharp and "scaggy" bits of metal will be found attached to the inner border of the aperture. The riffler is then put in the chuck, and, using a speed of 8000–10,000 r.p.m., it cuts away these adventitia, leaving a smooth edge to the aperture which will not catch on the skin. The finishing-off process is carried out in exactly the same way as the grinding process. A hard rubber buff is used dry.

The needle must not be allowed to overheat at all during the grinding process. Overheating is shown by discoloration of the metal. A cutting edge and point made of overheated steel never last long. Care must be taken in the removal of grit and particles of steel from the inside of the needle after it has been sharpened.

PERNICIOUS ANÆMIA AND PITUITARY INSUFFICIENCY

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IN 1937 Snapper, Groen, Hunter and I[1] reported a series of cases in which pituitary disease was associated with achlorhydria and anæmia, usually of the Addisonian type. Since then I have had two more cases under observation and I have learnt of others from colleagues, so that I have little doubt that the association of these rare diseases is more than a coincidence. A brief account of the two cases follows. The first was not absolutely proved to be an Addisonian anæmia as no evidence of megaloblastic degeneration of the bone-marrow was secured on sternal puncture, but about the second there can be hardly any doubt.

CASE 1.—Male, aged 58. The salient features in his past history were that only one testis had descended, that he had not married till age 46 and the union was sterile. The first symptoms of real illness were not till age 56 when he developed bitemporal hemianopia and pernicious anæmia. He showed in full measure the artistic ability, the gentleness and the dependence which so often characterise the personality structure of hypopituitarism. His skin was lemon yellow and smooth, and his scalp hair thin and silky. Stereoscopic radiograms showed an enormous pituitary fossa with an intrasellar fleck of calcification, and Mr. J. Pennybacker diagnosed a cranio-pharyngioma. There was achlorhydria and anæmia of high colour-index with a Price-Jones curve at the extreme right of the normal range. The basal metabolic rate was normal. In spite of treatment with liver the red-cell count at first fell and reached its lowest level—red cells 2,730,000 per c.mm., hæmoglobin 66%, colour-index 1·2, white cells 6000 per c.mm., differential count normal. Although a successful sternal puncture was made at this time, the smears were identical with the peripheral blood. A large internal hæmorrhoid, from which there had been streaky bleeding, was treated by the injection of phenol in oil; thereafter the patient responded well to liver and his count rapidly improved to 4,230,000 red cells per c.mm. and 96% of hæmoglobin.

CASE 2.—Female, aged 44. She was a small wizened woman with an almost simian appearance and looked much older than her age, although her hair was still black. She had never menstruated. The genitalia were small and underdeveloped, and the breasts and nipples small and prepuberal. The basal metabolic rate was within normal limits. There were no gross changes in the visual fields or skull though the pituitary fossa was small. The excretion of 17-ketosteroids was less than 3 mg. a day (C. L. Cope). The endocrine lesion was diagnosed as atrophy or hypofunction of the anterior lobe of the pituitary gland. The complaint which had brought her to hospital was a severe anæmia of the Addisonian type—red cells 1,710,000 per c.mm., hæmoglobin 38%, colour-index 1·1, white cells 9000 per c.mm., differential count normal, serum bilirubin 2·4 mg. per 100 c.cm., achlorhydria. On treatment with liver she had a classical reticulocyte crisis and her hæmoglobin rose rapidly to 80%.

The association of pernicious anæmia with hyperthyroidism,[2] with pregnancy and with pituitary disease, suggests that there is a hormonal element or mechanism which can lead to the degeneration of the cells which secrete the intrinsic factor. The incidence of pernicious anæmia increases with advancing years, and from a

1. Snapper, I., Groen, J., Hunter, D., and Witts, L. J. *Quart. J. Med.* 1937, **6**, 195.
2. Meulengracht, E. and Hartfall, S. J. *Guy's Hospital Rep.* 1934, **84**, 25.

wider biological point of view we may consider the association of pernicious anæmia with hypopituitarism as another example of the precocious senile changes to which the patient with pituitary disease is liable. From the more immediately practical point of view it is useful to remember that some of the physical and nervous symptoms of pituitary disease may be due in rare instances to an associated pernicious anæmia and may be relieved by treatment with liver.

SULPHAMETHAZINE

CLINICAL TRIALS IN CHILDREN

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OUR colleagues, Macartney and others,[1] recently used sulphamethazine in the treatment of 73 cases of lobar pneumonia in adults and reported on its high therapeutic efficiency, the low incidence of nausea and vomiting compared with sulphapyridine, and the absence of cyanosis. They considered renal complications unlikely in view of the relatively high solubility of the compound.

This paper deals with the use of sulphamethazine in children and infants, 32 acutely ill and 6 healthy.

DOSAGE, BLOOD CONCENTRATION AND TOLERANCE

The doses given by mouth were:

Age (yr.)	Initial dose (g.)	Six-hourly dose (g.)
0–½	1·0	0·5
½–2	1·5	0·75
2–5	2·0	1·0
5–10	2·5	1·5
10–15	3·0	2·0

For patients under 5 years the drug is best dispensed in powders for accuracy, and can be given in suspension in milk or fruit juice. The sodium salt of sulphamethazine for intramuscular or intravenous injection was supplied in ampoules of 3 c.cm., each containing 1 g. to be diluted to 10 c.cm. with sterile distilled water before use. The dose of this given was 0·05 g. per pound body-weight. The precaution was taken of never adding a dose of the sodium salt to transfusion fluids such as saline, glucose or blood. There was only one occasion to use the intravenous route, but the intramuscular route was used a number of times and in no case was there any ill effect at the site of injection.

The level of the free drug in the blood was estimated in the first 24 hours of treatment and daily thereafter. No attempt was made to keep the level within preconceived limits; 184 blood-level estimations were made—138 on 32 sick children and 46 on 6 healthy children. The level in the cerebrospinal fluid was measured on 17 occasions. The children in the "ill" group ranged in age from 2½ months to 13 years, and in these the average amount of sulphamethazine given in the first 24 hours was 4·2 g., giving a mean blood concentration of 16·5 mg. per 100 c.cm. The lowest concentration was 3·8 mg. and the highest 29·8 mg. per 100 c.cm. The highest figure was obtained in an infant aged 2½ months, and it was found that on the standard dosage the highest levels were obtained in children under 3 years. This is the age-group with the highest fatality in both bronchopneumonia and meningococcal meningitis and the early attainment of high levels is a sound principle.[2] In all the ill patients the highest blood-level attained by each case throughout treatment was reached within 48 hours of the beginning of the therapy and in many cases within 24 hours. Thereafter the level tended to drop considerably. The average duration of chemotherapy was 4½ days; it was either discontinued abruptly or reduced doses were given for 24 hours and it was then stopped. Estimations made the day after discontinuance gave only a trace or a very low concentration of the drug. In 6 healthy children between the ages of 1 year and 12 years the standard dose for their age was given for 7 days and the drug level was estimated daily. There was considerable individual variation. The lowest figure obtained was 3 mg. and the highest 22·4 mg. per 100 c.cm. There was a notable absence of the drop in level which took place in the sick child as he improved clinically.

Sulphamethazine was well tolerated by all age-groups. Vomiting attributable to the drug did not occur in any of the sick children. Nausea and depression are not easy to assess in children and are not notable with other sulphonamides, but it has been estimated that about a third of child patients having sulphapyridine therapy vomit as a direct result, particularly in the intermediate stages of treatment. There was no cyanosis and no sign of renal trouble. White-cell counts made on a number of cases during and after stopping treatment showed no evidence of depression of leucopoietic activity. One infant of 5 months who had a total quantity of 7 g. sulphamethazine with a maximum blood-level of 13·8 mg. per 100 c.cm. developed a morbilliform rash. Two of the healthy children aged 1 year and 10 years developed rashes after having 23 g. and 53 g. respectively; there was no other detectable constitutional disturbance. These amounts are much greater than those required for ill children of the same age-groups.

CLINICAL NOTES

Bronchopneumonia.—The drug was given to 11 children with bronchopneumonia, of whom 9 were under 2 years. The cases were selected because of clinical severity. The diagnosis was confirmed by two observers and in all but 2 cases was supported by radiographic evidence. All patients responded within 36 hours of the start of treatment and all recovered. One child had a relapse a week after treatment was stopped; no chemotherapy was given for 4 days and then sulphamethazine was restarted with satisfactory response.

Meningococcal meningitis.—Ten patients aged 2 months to 10 years suffering from meningococcal meningitis were given sulphamethazine. Group I meningococcus was isolated from 8 cases and 7 of these recovered. The fatal case was in an infant of 2 months admitted to hospital on the 5th day of disease; he died 18 hours after admission having had a total dosage of 2 g.

Group II meningococcus was isolated from one patient. This infant, aged 8 months, died after 3½ days in hospital. During this time he had 9·75 g. of sulphamethazine. The level of the free drug in the blood on the first day of treatment was 8·8 mg. per 100 c.cm., and it was 15 mg. on the second day. There was no evidence of improvement after increase of the standard dose. At autopsy the CSF was still turbid and there was a fibrinous exudate at the base of the brain. Samples taken at autopsy gave the following levels of free drug per 100 c.cm.: heart-blood 33·8 mg., pericardial fluid 31·8 mg., muscle 18 mg.

The remaining patient, a girl of 7 years, was admitted in the third week of meningitis having been inadequately treated with sulphapyridine. She was extremely emaciated and had intractable cerebral vomiting. Treatment consisted of an initial intravenous injection of 2 g. of the sodium salt of sulphamethazine followed by intramuscular injections of 2 g. every 6 hours. In all, 23 intramuscular injections were given and careful examination of the injection sites showed no sign of reaction. At the time of writing very satisfactory progress has been made by the patient but the question of complete recovery is still doubtful.

Lobar pneumonia.—Six patients aged 1 year to 13 years responded well to sulphamethazine. The patient of 13 years developed a type I pneumococcal empyema. All recovered.

A miscellaneous group of 5 ill patients were given sulphamethazine and are included in the total number because they were fully investigated, but the clinical diagnosis is not relevant in the present account.

SUMMARY

A preliminary trial of sulphamethazine in children is reported.

High blood concentrations of the drug were safely obtained with the experimental dosage used. It is for further investigation to determine the necessity for such levels.

1. Macartney, D. W., Luxton, R. W., Smith, G. S. and Ramsay, W. A. *Lancet*, 1942, i, 639.
2. Colebrook, L. *Ibid*, p. 760.

The therapeutic efficiency of sulphamethazine in a small series of cases of bronchopneumonia and meningococcal meningitis was encouraging.

The same low toxicity reported in adults was observed in children and infants. Other advantages over sulphapyridine are easier oral administration with longer intervals between doses, and much less likelihood of trouble at the site of intramuscular injection when the sodium salt is used.

We are grateful for the advice of our colleagues in the Crumpsall Hospital Laboratory, where all the bacteriological and biochemical investigations were made; and we thank Imperial Chemical (Pharmaceuticals) Ltd. for supplying us with sulphamethazine.

TRICHLORETHYLENE ANÆSTHESIA

JOHN ELAM, B A CAMB, M R C S
VISITING ANÆSTHETIST TO THE WELLHOUSE HOSPITAL, BARNET

IN June, 1941, Hewer and Hadfield [1] published a preliminary report on the use of a purified form of trichlorethylene known as 'Trilene' (ICI) as an anæsthetic agent; these investigators found the drug satisfactory. A further report was read at the Royal Society of Medicine on March 6, 1942, by Hewer.[2] Since the first report I have used trilene, or supervised its use, in over a thousand cases. Trilene is a very heavy liquid, vaporising much more slowly than chloroform or ether. It is non-irritating and non-inflammable; it has a smell not unlike that of chloroform. It is now coloured blue to distinguish it from chloroform, which is often coloured red.

Certain mysterious deaths have taken place among industrial workers who have to use trichlorethylene; it is thought that these were due to impurities. The post-mortem reports of two recent deaths in industry were unsatisfactory and no real explanation was given of their cause. Some workers in trichlorethylene are considered to be liable to aplastic anæmia. Whatever the cause of recorded deaths, no anxiety as to the patient's safety has been experienced in the 1000 administrations under review.

Trilene dropped on an open mask does not give a satisfactory anæsthesia because it vaporises too slowly, but if it is placed in the chloroform bottle of a Boyle's machine and given in conjunction with gas and oxygen a satisfactory light anæsthesia is obtained. Marrett, at the RSM in March, showed an inhaler which he had devised by which air was inspired by the patient through a bottle containing trilene. Trilene may also be given from a Shipway apparatus. The anæsthesia obtained is in some ways like that obtained with chloroform, except that full muscular relaxation is not uniform.

The similar composition of trichlorethylene and chloroform led to the fear that the new drug might have similar dangers, but so far this has not been the case. There has been no evidence of primary cardiac failure during induction with trilene, there appears to be no danger from its readministration, and there has been no evidence of delayed trilene poisoning.

The main features of the drug have been these. It is very easy to administer and is particularly suitable for general-practitioner work. Its administration over a long period appeared to cause no shock. (The longest administration in this series was 4½ hours.) There is very little vomiting even after long administration. For operations such as amputation of the breast there is much less hæmorrhage than when ether is used. The respiration-rate increases considerably after the administration has been in progress a few minutes, but if morphia or a barbiturate is given as premedication this rise is not so noticeable and in many cases is absent altogether.

For major abdominal operations trilene alone does not give sufficient muscular relaxation, but it is very useful in the induction period, gas-oxygen-trilene being used and ether added to obtain the required relaxation.

I would especially call attention to its use in midwifery for it appears to have very little effect on the uterine muscle, and a weak mixture of trilene and air will give an analgesia similar to that obtained with gas and oxygen. Other operations in this series in which trilene has been found most satisfactory have been: operations on the skull such as depressed fractures (the patients were bad risk cases, but gave no anxiety whatever), operations on the nose and throat, and dental operations. Trilene gives enough relaxation of the jaw muscles to enable a large gag to be inserted for tonsil or mouth operations. It is a great comfort to both surgeon and anæsthetist to work with a non-inflammable anæsthetic, which does away with the risk of fire or explosion from lights, cauteries or suckers. Because of its property of not increasing hæmorrhage trilene made operations on the thyroid easier, and the absence of vomiting afterwards was a comfort to the patients. No attempt has been made to use trilene for intrathoracic surgery, although it has been successful for opening and drainage of empyema. It is always difficult to anæsthetise an empyema patient with gas-oxygen only, unless he has been carefully premedicated, and one is often asked to give these anæsthetics as an emergency. For orthopædic operations, especially on aged subjects—for example, the insertion of a Smith-Petersen pin—gas-oxygen-trilene is particularly suitable.

With the Boyle's apparatus in use at most hospitals today it is difficult to give pure gas and oxygen anæsthesia to the resistant patient and to keep him a good colour. The addition of trilene to the gas and oxygen makes just the required difference and does not appear to upset the patient. There are very real dangers in trying to do too much with gas and oxygen, as American anæsthetists have shown, and trilene seems to be the drug we have been looking for to enable us to avoid these dangers.

Manufacture presents no difficulties, though the supply is limited at present because such large quantities of trichlorethylene are being used in industry.

SUMMARY

Trichlorethylene, or trilene, has been used as an anæsthetic in over 1000 cases. There have been no deaths which could be attributed to the anæsthetic. Its non-inflammability, ease of administration and absence of postanæsthetic vomiting make it a satisfactory anæsthetic when full abdominal relaxation is not required.

It is useful in conjunction with gas and oxygen for increasing the depth of anæsthesia.

About half the cases in this series were anæsthetised by medical students, to whom I am indebted for their help.

1. Hewer, C. L. and Hadfield, C. F. *Brit. med. J.* 1941, i, 924.
2. Hewer, C. L. *Proc. R. Soc. Med.* 1942, **35**, 463.

Reviews of Books

Victorian Doctor

The Life of Sir William Wilde. T. G. WILSON, MB, LittD Dubl. London: Methuen. Pp. 338. 15*s*.

To call Sir William Wilde a Victorian doctor hardly does justice to the sort of man he was; but then Dr. Wilson's notion of the Victorians differs a good deal from the conventional one. Thus he writes, "After all, Wilde had only two faults: his bad temper and his mistresses. In extenuation of these we may plead his many good points and remember that he lived in an immoral age; for all the Victorians were not good by any means." No doubt; but Victorian Dublin was so different from Victorian London, at any rate, that the adjective becomes too protean. It is customary to lament the decay of "characters"—of eccentrics and men with enough originality and independence to do as they liked: whether this is a needless regret or not, no-one could have had occasion to feel it who lived in Victorian Dublin and was familiar with the circles in which Wilde and Speranza moved. Neither Wilde nor his wife deferred to convention: and the famous trial—ominous of his son's catastrophe—would have done little harm to a more respectable man. W. B. Yeats said that the Wildes were "dirty, untidy, daring . . . and very imaginative and learned." Dr. Wilson's entertaining narrative gives body to these adjectives, and pictures a man of great ability and energy of mind who worked fruitfully at archæology, vital statistics, and his specialties of otology and ophthalmology. It evokes also a picture of Dublin during the middle of the last century, which makes one

sorry that its glories are now primmer, and its witty talkers and controversialists somewhat further from us. THE LANCET, it is pleasing to recall, championed William Wilde during his trial, earning for its report, from the cantankerous editor of the *Dublin Medical News*, such epithets as " hissing-hot rhodomontade," " safe, because unproveable, innuendo."

Some of Dr. Wilson's speculations about endocrine anomalies in the Wilde family have little to support them, and he is naive in his belief that people with repressed homosexuality are quick to recognise or accept it in others. But his medical like his other carefully assembled facts are otherwise admirably set forth: the book is a lively, accurate, well-written chronicle of a remarkable man, living in a remarkable city.

Modern Treatment of Syphilis

(2nd ed.) JOSEPH EARLE MOORE, MD, physician-in-charge, syphilis division of the medical clinic, and visiting physician, Johns Hopkins Hospital, Baltimore. London: Baillière, Tindall and Cox. Pp. 674. 38*s*. 6*d*.

THE first edition of this monograph by Dr. Moore and his colleagues appeared in 1933 and received a warm welcome. The present edition is modified in the light of knowledge gained in the past eight years. It draws extensively on the clinical material studied by the Coöperative Clinical Group in general and that of the syphilis division of the Johns Hopkins Hospital in particular, but other sources are not neglected, as an authors' index of 11 pages bears witness. The presentation is concise and the text benefits from the many tables and diagrams. There are 33 chapters presenting the biology of syphilitic infection in relation to treatment; the prognosis of untreated and treated syphilis; the therapeutic problem in the individual patient; the antisyphilitic drugs, technical procedures and possible reactions; the treatment of early acquired syphilis and the later stages, latent or manifest in different organs and systems; syphilis complicated by pregnancy; congenital syphilis; the interpretation of serological tests (by Dr. Harry Eagle); the therapeutic test; syphilis in relation to marriage and public health; the prophylaxis of syphilis and, finally, an appraisal of the present position of the intensive method of arsenotherapy.

The sound principles propounded should do much to raise the standard of syphilis treatment in the United States where many patients are treated by general practitioners. In this country the book will be chiefly appreciated by venereologists in the special centres, who treat the great bulk of cases. They may be surprised at the emphasis attached to the use of arsphenamine (' 606 ') in early syphilis and may remain unconvinced by the arguments advanceed in favour of the continuous alternating method of treatment. The intermittent method used in Britain gives good results and it is possible that American critics of the method have failed to distinguish carefully between results of properly planned intermittent treatment and those following irregular treatment. Diagnosis of congenital syphilis is discussed and the difficulties are emphasised of interpreting a positive serological result during the early neonatal period in infants born to women whose serum also gives positive results. The induction of malaria in the therapy of neurosyphilis in this country is now often effected by the inoculation of infected blood, and Moore's statement to the contrary (p. 375), based on a reference published in 1925, requires modification. But the author would get full marks in Colonel Harrison's catechism (*Brit. J. vener. Dis.* 1942, **18**, 71) and the monograph is warmly recommended to all those who treat syphilis in civil and Service patients.

Vade Mecum of Medical Treatment

(3rd ed.) W. GORDON SEARS, MD Lond. London: Edward Arnold. Pp. 371. 10*s*. 6*d*.

FEW subjects are more difficult to compress into a small space than that of treatment. Advice on therapeutics should be detailed. Dr. Sears has clearly realised the danger, even if he has not been able to avoid it fully. Despite his warning against the claims of the manufacturing chemists the book mentions a fair sprinkling of proprietary preparations, many of them little known. He is also rather fond of such general phrases as " . . . may be given if desired," " . . . the effect is doubtful, but it can do no harm," and a " vaccine may be indicated." The reader would welcome more dogmatic advice. But in the main he gives well-tried standard prescriptions—in some instances perhaps even allowing tradition to outweigh reason and experiment. For example when he discusses hæmatemesis he does not make it clear whether he recommends Meulengracht's method or not; and the reader is left to judge that initial starvation for 36 to 48 hours, followed by 1 oz. feeds 2 hourly, working up after a week to 5 oz. every 2 hours, is the method of choice. In future editions it might be worth adding pruritus and cough to the symptoms dealt with, and including some of the drugs recommended in the index. A table of modern—especially British—proprietary preparations would be useful.

A Practical Manual of Diseases of the Chest

(2nd ed.) MAURICE DAVIDSON, DM Oxfd, FRCP. London: Humphrey Milford, Oxford University Press. Pp. 575. 42*s*.

MUCH has happened in the chest world since the first edition of this book was published 5 years or more ago: the sulphanilamide group of drugs has been generally applied to pulmonary infections; the extrapleural pneumothorax has come (and almost gone); fresh advances have been made in the methods of giving oxygen; and there has been a deeper appreciation of the mechanism and consequences of pulmonary collapse. The accounts of all these subjects have been amplified in the second edition, and the section relating to atelectasis and bronchiectasis—a subject on which Dr. Davidson is especially qualified to speak—has been entirely rewritten in the light of modern work. The book is not only a practical manual of the whole field of chest medicine but covers the broad principles of chest surgery too, in the sane and common sense manner exemplified by the author's assessment of the true significance of thoracoplasty in the treatment of phthisis.

Clinical Atlas of Blood Diseases

(5th ed.) A. PINEY, MD Birm, MRCP; S. WYARD, MD Lond, FRCP. London: J. and A. Churchill. Pp. 134. 16*s*.

THIS familiar little book has been revised and is now a veritable textbook of hæmatology in miniature. The two plates of bone-marrow smears are disappointing and not very clear; this is especially true of the marrow of pernicious anæmia in relapse, in which the characteristic open network of the megaloblasts has failed to reproduce. The plate of eosinophil myelosis seems redundant and is nothing like as good as the plate which illustrates eosinophilia. Very few cases of idiopathic hypochromic anæmia have a blood picture like that shown. The treatment sections are generally sensible, but splenectomy is surely drastic for so vague a syndrome as chronic agranulocytosis; and mocassin snake venom is not now recommended for thrombocytopenic purpura. On the whole, however, this book maintains the usefulness that has kept it before the medical public for 12 years. The production is first-class and the price for a book containing so many colour plates is remarkably low.

Air Raid First Aid

W. A. ASHFORD. London: Williams and Norgate. Pp. 46. 1*s*. 6*d*.

THIS stiffly bound booklet summarises the essentials of first aid as presented to a first-aid party at an incident. It does not attempt to cover the ground of the ordinary textbooks but supplements them; and in some instances it modifies standard teaching. The author has clearly had first-hand experience of the blitz and he has put it to good use. The material is presented in a clear and simple fashion and will be useful to all who have to treat air-raid casualties. There are a few misleading statements: for example, the novel explanation for grey asphyxia, " the red corpuscles are turning white through need of oxygen." Then bandaging a fractured patella without splints is recommended if the patient is reasonably near hospital, and this is quite unsound. The misconception, so widespread among first-aiders, that saline is an antiseptic rears its head again. Apart from these three bloomers, serious though they are, the pamphlet is worth having because it brings into sharp focus the special conditions of air-raid work.

VITAMIN THERAPY
DURING PREGNANCY AND LACTATION

Increasing experience shows that a low level of maternal nutrition may be responsible for many of the disturbances which have hitherto been regarded as inevitable accompaniments of pregnancy. Apart from the demands of the developing foetus on the mother's resources, vomiting and anorexia, so common in the early stages of pregnancy, often result from low B_1 intake and in turn markedly increase the deficiency.

One authority has recently stated that mild, and often neglected, complications such as œdema and "pins-and-needles" may well be due to hypovitaminosis B. Another suggested that the pains in the back and legs, and instability in walking, often occurring during pregnancy, are possibly early signs of vitamin D deficiency. Dental caries, anæmia, and cramps may also be manifestations of inadequate nutrition generally.

It is readily understandable, too, that the extra demands of pregnancy may render more apparent the other recognised signs of vitamin deficiency, such as anorexia, constipation and diarrhœa, ready mental and physical fatiguability, and emotional instability.

INCREASING THE PROTECTIVE FACTORS

Ample clinical experience has shown that a fully satisfactory diet tends to reduce the incidence of pregnancy disorders such as nausea and vomiting, anorexia, œdema, neuritis, constipation, irritability and fatigue. The inclusion of vitamin E, as a means of preventing abortion, is now well established.

Since it is apparent that vitamin deficiency in pregnancy is usually multiple, the importance of ensuring a sufficient intake of all the known vitamins and essential mineral salts is obvious. Since, moreover, it is of primary importance that the mother be in as good a state of nutrition as possible, from the very beginning of pregnancy, attention should be paid to the quality of the diet in the early months, and, because the drain caused by pregnancy and lactation may possibly be greater than was anticipated, protective measures are advisable until several weeks after lactation is completed.

RECOGNISED DIETARY SUPPLEMENTS

The following vitamin products are of particular interest to the physician who desires to supplement the mother's diet :—

PREGNAVITE TABLETS provide the amounts and proportions of the Vitamins, A, B, C, D, and E and of available iron and calcium shown by recent dietary surveys to be necessary for pregnant women. Their use definitely ensures that poor diets are rendered adequate in these essential food factors.

Pregnavite in recommended doses supplies approximately :—

VITAMIN A	4,000 i.u.	VITAMIN E	2 mg.
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VITAMIN D	300 i.u.	AVAILABLE IRON	12 mg.

The total cost of prescribing Pregnavite Tablets is considerably less than that of supplying the factors singly. In those cases showing an excessive gain in weight during pregnancy, the calorific value of the diet may safely be reduced, if Pregnavite Tablets are employed to prevent the resulting lowering of the vitamin intake.

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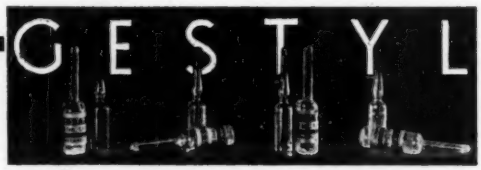

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Summary.—A case of delayed puberty in a fifteen-year-and-nine-months-old female in whom all signs pointed to an arrested ovarian development, was treated with the gonadotrophic hormone from pregnant mare serum. The resumption of ovarian development was evidenced by: (*a*) Mammary development and increase of pubic hair; (*b*) curbing of excessive linear growth; (*c*) closure of the metacarpal and phalangeal epiphyses; (*d*) alteration of the character of the vaginal smears; (*e*) the continuation of normal and regular menses. The gradual improvement in the general condition, and the absence of any signs of regression of the recently developed characteristics in 16 months following cessation of treatment, substantiate the completed puberty of our patient. (*J. Clin. End. Apr. 1942, p.254*)

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THE LANCET

LONDON: SATURDAY, SEPTEMBER 12, 1942

PERSONAL FACTORS IN ACCIDENTS

THE terms of reference of the Industrial Health Research Board, both in the past and as recently revised (see p. 326), have naturally laid stress upon the importance of the board making widely known in industry those results of its researches which are capable of application. With this end in view it has adopted during the war an issue of emergency reports which, with a minimum of technical details, review the work published in full in its prewar report series. The latest addition deals with the personal factor in accidents.[1] With the employment of greater numbers of people, many of them young and inexperienced, many on dangerous work, there has naturally been a large increase in industrial accidents, and attention to some of the factors involved is therefore timely. Such factors may be divided under two broad headings—general and personal. The general ones include such features as the hours of work, the heating, ventilation and lighting of the factory, the experience, age and fitness for work of the employee, and the attitudes of both the management and the workers; the personal include the individual differences between workers in accident-proneness.

In the last war excessively long hours of work were found, as would be expected, to lead to an increased accident rate; though long hours are, to some extent, inevitable under war conditions their effects may be partially offset by rest pauses, changes of occupation and similar relief measures. Inexperience may be let down lightly by a planned absence of exposure to special dangers during the process of learning and adaptation. New entrants, too, should not be allowed to pick up the technique of their occupation in the ordinary course of production. Training schemes often appear to be wasteful of time, especially for simple processes, but they often save time in the end by turning out workers who are more productive and less liable to accidents. Such methods are likely to be particularly fruitful with the young worker. On the other hand, elderly workers have to learn a new set of muscular habits when their physical efficiency and general quickness of uptake have begun to decline. Their employment on jobs demanding very rapid movement is clearly undesirable. Equally obvious is the need for attention to efficient passageways for the movement of goods and raw material, and to the height of work benches. Obvious, indeed, all these precautions may be, but they are not always regarded in a drive for production which sometimes leads to the view that a toll of accidents is inevitable. It is true that action based on such simple characteristics of industrial life may well have considerable effect on the incidence of accidents.

Much more difficult is the problem of the accident-prone. Statistical research has shown—as was long dimly recognised in practical life—that even given equal exposure to risk people are not equally liable to incur accidents, but the crux of the problem is to recognise the prone before they do themselves or others harm. For nearly 20 years the board's investigators have been experimenting with tests, with some success in skilled, though not in unskilled, occupations. In the former the æsthetokinetic group of tests, involving rapid and accurate hand and eye coördination, has been the best line of approach, though even here the correlation between ability to perform the tests and accident incidence is unfortunately not close enough to ensure that the small minority who will have most accidents will be surely detected. An alternative, or rather complementary, method is the accurate recording of the number of accidents sustained by each individual during a specified period of exposure. Though sometimes the door must be shut after the horse has gone there will be many instances in which the worker can be diverted on the basis of his experience, especially in the early stages of industrial life, to work where the accident risks are less. The most effective procedure lies, the report suggests, in a combination of these two procedures—first selecting by means of the psychological tests and then at the end of an initial period removing from risk those with an unduly high accident rate. All the accident-prone will still not be detected and injustice too may be done, but it will not be a serious injustice if the worker can be moved early in his career without loss of prestige or pay. There is no question of not employing those believed to be accident-prone; they can be usefully employed in many occupations. An essential is a careful recording of all accidents, however slight, and this clearly written report ends with a specimen form for the purpose. Its widespread use would produce necessary data for further research as well as achieving the specific purpose of seeking out the accident-prone and focusing attention on work carrying particular risks of either minor or major accidents.

1. Emergency Report, No. 3. H.M. Stationery Office, 1942, pp. 19. 4d.

TRAINING FOR CHILDBIRTH

THERE is a very old and widely held belief that intensive physical training in women interferes with the reproductive functions. Even in recent times every development in the athletic training of girls has had to fight not only popular prejudice but professional disapproval. Quite mild gymnastics or ball games have been credited with all sorts of evil consequences, from dysmenorrhœa to sterility. And long before gymnastic mistresses were thought of, female circus-performers were darkly suspected of inability to bear their children normally—if they conceived at all. These allegations, so detrimental to a free and healthy life for girls and women, were never firmly based on a scientific theory of movement, nor were they borne out by any statistical evidence. It has never been clear why improved suppleness of the joints, or well-developed abdominal and pelvic muscles should inhibit childbearing. It is the flabby, idle woman who is the obstetrician's bugbear. There are no easier labours than those of peasant women who spend their lives in much heavier physical exertion than the keenest gymnastic mistresses. The dangerous possibility seems to be that certain "stunts," more common among circus performers than among gymnasts, might conduce to perineal rigidity or uterine displacement. In view of the importance of avoiding any methods of physical culture which would interfere with the chief function of women, investiga-

tion was overdue, and there is every reason to welcome the inquiry into the effect of gymnastic training on childbearing carried out by a joint committee of the Medical Women's Federation and the Ling Physical Education Association.

The Ling Association have for long been keenly aware of the responsibility which rests on the physical advisers of the future mothers of the race. With this in mind, their training methods have been substantially modified in recent years to increase muscular flexibility and harmony. Every effort is made by the modern gymnastic teacher to avoid producing rigidity or excessive muscular development of any part. The results of the inquiry, as summarised by Dame JANET CAMPBELL in the published report,[1] show a considerable measure of success. The inquiry had to surmount many difficulties, some inherent in the subject and others due to war conditions. The heads of the principal physical training colleges were asked to get into touch with former students and obtain their replies to questionnaires drawn up by the committee. Each student was also asked to find a sister or other relative to fill up a similar form and thus to act as a control. Returns were made by 759 gymnasts and 423 controls, a number too small to satisfy a statistician but enough to give a fair picture of obstetrical conditions in a representative group. The returns were classified according to the age of the women at marriage and the duration of the marriage—whether more or less than 15 years. The gymnasts shared no significant differences from (or even compared favourably with) the controls as regards health in pregnancy, length of labour, amount of instrumental interference, percentage of complications and perineal damage. The number of live births in each group shows that their fertility was about equal. Only in respect of the number of stillbirths and miscarriages were the gymnasts at a disadvantage. There were 36 stillbirths and 182 miscarriages among the gymnasts as against 10 stillbirths and 84 miscarriages among the controls. As Dame JANET points out, this question calls for further investigation, as the possibility of association with greater physical activity cannot be excluded. The report does not say whether the gymnasts continued their activities after marriage, so no useful deduction can be drawn at this stage.

If the inquiry, limited and incomplete as it inevitably was, has proved reassuring in regard to the physical training of women, it is less satisfactory in the light it throws on the practice of midwifery and the exercise of the reproductive function in a sample group of women of the professional class. For this purpose the gymnasts and their controls may be considered together. In the first place, these women of good stock and superior physique are not reproducing themselves. Even among the group who married between 20 and 24 and have been married over 15 years, the average size of the family is only 2·95—less than enough to maintain the population at its present level. The other groups had even fewer children. This is not due to loss of fertility, for out of 97 women whose marriages were childless 43 stated that the sterility was intentional; 46% of all the women admitted to using contraceptives before the birth of the first child and 67% after the first birth. Again, the amount of artificial feeding is disappointing in women who must all or nearly all have had much hygienic teaching. Less than half the mothers in some groups suckled their children and the highest percentage was 77% among some of the controls, but these figures are subject to reservations and qualifications. This is not a war-time or even a recent phenomenon, for the older women had a worse record than the younger ones. The most disquieting revelation however is the amount of instrumental interference to which these mothers were subjected. Among the primiparæ it varied from 23% to 5% in the women married when over 30, and even in multiparæ it is nowhere below 6%. Dame JANET CAMPBELL points out that the data do not enable us to say whether the forceps were merely used at the end of labour in an otherwise normal birth or for some definitely abnormal condition. In any event the figures should cause some searching of the heart among obstetricians. The reports of voluntary and municipal hospitals, and of the domiciliary midwifery service, show that forceps deliveries among working people constitute less than 5% of the whole—sometimes much less. The aim of every antenatal clinic is to give a mother the courage and capacity to deliver herself. Is there such a thing as "class midwifery?" Either the working-class woman is entitled to more instrumental aid to relieve her sufferings or the middle-class woman should do with less. It seems unlikely that the public at large will listen to hygienic advice from the professional classes if their women-folk do not carry it out themselves. A poor man's wife has presumably as good reasons for limiting her family to a degree which threatens the national existence, for refusing to breast feed her infant and for demanding instrumental aid in delivery, as these gymnasts and their sisters. This inquiry gives a valuable hint on how propaganda could most usefully be directed.

1. *Med. Wom. Fed. quart. Rev.* July, 1942, p. 41.

THE SOLDIER'S FOOT

PAIN in the feet is one of the commonest symptoms confronting the regimental medical officer, and, as an official bulletin [1] puts it, it is his duty to keep good feet symptom-free rather than render those with gross deformities fit for service. The most that can be demanded of the soldier's foot is that it should be supple, painless, of adequate musculature and free from gross deformity; when these qualities are present minor degrees of hallux valgus, hallux rigidus, pes planus and cavus need not remove their owners from the A1 category. Pain is the foot's main safeguard, and untreated may lead to habitual malposture and recurrent foot-strain; the MO can usefully detect the minor alterations in gait and behaviour suggestive of unreported trouble and elicit the cause. In Army life there are three periods at which pain may arise—on enlistment, at PT and after route-marching. On enlistment, the change from light civilian shoe to heavy Army boot throws a temporary strain on the tibialis anterior which may develop into a chronic fatigue with diffuse pain referred from tender points in the muscle, or an acute tenosynovitis may be set up. The long extensors of the toes then tend to help in dorsiflexion of the foot, so that the toes become sore and callous from rubbing against the toe-cap and a valgus foot is eventually produced with clawing due to simultaneous use of all the extensors. This is the

1. *Army med. Direct. Bull.* July, 1942, p. 1.

incoördinated foot which, as CRISP [2] says, the owner uses as a cow its hoof. During route-marching an acute foot-straining occurs, often in association with tender nodules in the plantar fascia and flattening of the metatarsal arch, and these feet must be rested until completely painless. In physical training a symptomless hallux rigidus is often provoked by certain exercises. The soft plimsoll is pernicious in this respect, and the stiff shrunk sock encourages any tendency to clawing of the toes. The bulletin emphasises that the length of treatment is proportional to the duration of symptoms, so that early referenee to an orthopædic surgeon is desirable. CRISP points out that, while a minority of foot cases have entered the Army with glaring defects in too high a category, most of the trouble is due to the breaking down of apparently normal feet during training. The Army boot is comfortable and harmless to the normal foot, but aggravates any tendency to weakness, stiffness or incoördination, and the speed at which gross deformities may develop and become fixed is astonishing. A previously weak foot may develop an acute planus which requires long rest and careful re-education in hospital for 6–8 weeks, while the stiff civilian foot will tend to break down again and again under Army conditions until the patient is hospitalised, rested and the foot manipulated. Re-education is particularly required for the valgus foot with clawing due to incoördinated extensor action already mentioned; and once these patients have re-learnt the use of their intrinsics and to dissociate dorsiflexion from extension of the toes they are well on the way to recovery. The main lesson to be drawn from a study of the large amount of material provided by the war is that the painful foot is a major disability which usually requires hospital treatment; incomplete outpatient supervision leads too often to a vicious circle of recurrent pain and stiffness. Preliminary bed-rest is necessary for the majority, and individual attention from the physiotherapist should precede participation in the general foot-class. In few other disabilities is the end-result affected so largely by the patient's willingness to coöperate and general morale, and a preliminary report by the RMO on the man's character assists in deciding between palliative and radical treatment, or whether re-grading is necessary.

THE DYSENTERY BACILLI

BACILLARY dysentery may be caused by any one of a group of non-motile gram-negative bacilli, of which the principal members are named Shiga, Schmitz, Sonne and Flexner. The first two—differentiated from the others by their failure to ferment mannitol, and Schmitz from Shiga by its production of indole—are rare causes of dysentery in this country; Schmitz has been found in outbreaks of asylum dysentery and occasionally from sporadic cases outside mental hospitals, and Shiga is imported from abroad—it has lately been recovered from symptomless Italian prisoners of war.[3] The Shiga, Schmitz and Sonne bacilli, the last type associated with an enteritis often unaccompanied by blood or mucus, are each single antigenic entities. The Flexner bacillus, on the other hand, is an antigenic family, the members of which have their own specific antigen but share, in addition, a common group antigen which links them together.

2. Crisp, E. J. *Proc. R. Soc. Med.* 1942, **35**, 217.
3. *Monthly Bull. emer. publ. Hlth Lab. Serv.* June, 1942, p. 9.

BOYD [4] found that on repeated culture in the test-tube the specific antigen tends to disappear, leaving behind the group antigen. As a result, the Flexner type Y of Andrewes and Inman,[5] which contains only group antigen, drops out as a specific type, as does X which BOYD regards as an incomplete variant of Z, but the family is augmented by three new types—type 103 which has a wide geographical distribution and has been found in this country, P 119 occurring in India, South Africa and the Far East, and the well-known Newcastle bacillus which is now endemic in certain parts of this country and differs biochemically from all the other members of the Flexner family in not producing indole and usually fermenting dulcitol as well as glucose with slight gas-formation. BOYD suggested that these six members of the Flexner group, the V, W and Z types of Andrewes and the three new types 103, P 119 and Newcastle, should be called *B. dysenteriæ* Flexner I–VI, and the Army Medical Service has adopted this new and simplified nomenclature. In addition, BOYD has isolated in India a number of antigenically distinct mannitol-fermenting dysentery bacilli lacking the Flexner group antigen, and for these the name *B. dysenteriæ* Boyd I, II, III &c. is suggested.

The isolation and identification of the dysentery bacilli has lately been made much easier by the use of new media and technical methods. Formerly, isolation of the pathogen was easy only in the acute stage of the infection, and even then, because the dysentery bacillus was supposed to die very quickly, it was often advised to bring the bed-pan with the freshly voided stool directly from the ward to the laboratory. Now, with the use of desoxycholate-citrate agar [6] which inhibits the growth of most coliform organisms, the dysentery bacilli can be isolated even when they are greatly outnumbered by *B. coli*, as happens in convalescence or in contact carriers or when the fæces have lain for some time before cultivation. Contrary to current teaching, the Sonne dysentery bacillus will survive in fæces or on a moist rectal swab for several days at atmospheric temperatures of 15–20° C., and observations reported by CRUICKSHANK and GILLESPIE in a letter on another page have established a similar viability for the Flexner bacillus. At higher temperatures, such as may obtain in Egypt and India, the organisms die out more quickly, so that the buffered glycerol-saline preservative should be used if there is likely to be much delay in getting the specimen to the laboratory; or alternatively the rectal swab dipped in saline agar may be tried. The heavy growth on the desoxycholate-citrate agar makes it easy to pick off colonies for direct slide-agglutination with the appropriate antisera. Few strains of the Sonne or Flexner races fail to agglutinate in this way, but with new cases confirmation from the biochemical reactions may be sought by subculture. Serological subdivision of the Flexner group is not ordinarily required but may be essential epidemiologically for tracing sources of infection. Monospecific sera can be readily prepared by absorbing out the group agglutinins. Thus with modern methods the bacteriologist can make or confirm a diagnosis of bacillary dysentery within 18–24 hours of receipt of the specimen, without much fuss and with an accuracy approaching 100%.

4. Boyd, J. S. K. *Trans. R. Soc. trop. Med. Hyg.* 1940, **33**, 553.
5. Andrewes, F. W. and Inman, A. C. *Spec. Rep. Ser. med. Res. Coun. Lond.* 1919, No. 42.
6. Hynes, M. *J. Path. Bact.* 1942, **54**, 193.

Annotations

"MEDICAL OFFICER TO THE UNIVERSITY"

NEXT month Birmingham University is to have its own medical officer, at a salary of £750, to examine undergraduates and act as medical adviser to the physical education department. He will also be expected to undertake research work. Alongside the advertisement for this post appeared one for a medical officer to an industrial undertaking with 2000 employees, at a salary of £800, described as a "pioneer post"—a designation perhaps equally appropriate for the Birmingham job, although the idea has been germinating for many years on a voluntary basis. It was in 1937 that the National Union of Students decided to press for the appointment by each university of a medical officer to keep in touch with the student body as a whole. In Scottish universities the trend has been towards a small medical panel of the younger teachers to implement a scheme of examination and advice on an insurance basis, but it may be noted that Sheffield after toying with a voluntary scheme of thorough clinical examination for entrants to the university has now made it both gratuitous and compulsory for the coming session. In London, where the medical schools are more sharply differentiated than elsewhere from the general community of students—recognising no doubt that the special risks of their vocation require special measures—various voluntary schemes have been evolved and have acquired the compulsion of popular approval. The routine X-ray examination of the chest at UCH has now five years of useful experience to its credit. At Bart's, when physical training was gaining recognition, the junior physician on the staff was told off to discover which students were fit for different types of training and to study the effect on their health. For the past seven years every entrant to the hospital has submitted a curriculum vitæ and a clinical examination by his own doctor which has been checked up year by year. The kind of informal experience thus gained on both sides is an earnest of what may be achieved in a more formal way by appointments such as that now made at Birmingham. The guidance to their physical development which students will receive at this testing period in their career should be of inestimable value to them in making the best use of their cultural opportunities. As far as medical students are any guide, the initial healthiness has exceeded expectation and the university MO may well find himself linked more closely to preventive than to clinical medicine. The crux of the problem, as the dean of St. Mary's has long insisted, is for the student to take a pride in becoming physically fit. Both of the advertisements we have cited are significant of the new outlook towards positive health.

UNION OF THE FRACTURED TIBIA

FRACTURES, especially those of the adult tibia, seem to be taking longer to unite than they did. This impression is supported by few accurate figures, but at the British Orthopædic Association meeting in Liverpool it received general support. The young and otherwise healthy limbs of the armed forces appear to be particularly prone to sluggish union, but it affects closed as well as open fractures and fractures of one or both of the lower leg bones with apparent impartiality. If this impression is grounded on truth, the fault must lie in the fractures, in the healing powers of the patients, or in the methods of treatment employed. It is characteristic of modern surgery that the third of these possibilities is the one to which most attention has been given. It might perhaps have been wiser if more research into the intrinsic factors affecting union of broken bones had preceded the argument centring round the purely extrinsic factors which are more easily controlled by the surgeon. On another page Burns and Young have made a careful attempt to prove and explain the recent prolongation of the period necessary for union in the tibia. They compare small series of cases treated in St. George's Hospital before 1930 with a larger series treated in an EMS hospital during the present war. The *average* period of union (a figure admittedly liable to fallacy) is undoubtedly longer in the latter series and this has led them to consider the advisability of returning to older methods of treatment which have been discredited mainly as a result of the widespread introduction of Böhler's methods without of necessity Böhler's principles. Those who have seen Burns's cases must agree that plating, properly and carefully performed with due regard to the essential impaction of the fracture on which Lane himself insisted, must not be dismissed as lightly or condemned as heartily as it was when Vienna was the fracture-surgeon's Mecca. For that matter, it would be idle to deny that our forefathers could obtain creditable results in these fractures with apparatus which now only adorns medical museums and Conjoint final examinations. Whether a comparison of civilian fractures incurred between 1927 and 1930 with the fractures seen in the army of today is a fair one is questionable. The view can be taken, as both Harlan Wilson and Griffiths maintained at Liverpool, that the severer violence responsible for the military fractures (a surprisingly large number of which occur in accidents with rapidly moving vehicles) is at least one factor whose importance as a delayer of union may well override that of the Steinmann nail or the non-padded plaster. Again, the indefiniteness of the state of "clinical" union, the impossibility of timing union accurately to a week or a fortnight, and the fact that the diagnosis of union has not uncommonly to be revised a few weeks after it has been made, make "non-personal" civilian cases of before 1930, whose subsequent history is not always known, an imperfect yardstick for checking results obtained in a "personal" series of well-documented EMS cases. Possibly, too, union is receiving undue attention. Most surgeons, if they sustained a fracture themselves, would willingly sacrifice four extra weeks of their working time if they could be guaranteed union in perfect alignment, rather than attain rapid union by imperfect reduction or imperfect splintage. As F. W. Holdsworth urged at Liverpool, it is the quality of the end-result rather than the time taken to reach it which really matters. Burns and Young, however, have done good by demonstrating that fracture therapy did not begin in 1930 or thereabouts, and that some recent advances may have been in the wrong direction.

1. See *Lancet*, July 4, 1942, p. 9.

THE PATIENT'S PART

THE Shakespeare Committee have at their disposal a complete Domesday Book of the medical skill of this country, giving them the staff and bed accommodation of every hospital in this country and an analysis of general practice, and in making their reports, summarised in our columns last week (p. 290), they have tackled the problem of medical man-power from the point of view of fair and economical distribution. Now it is up to the public to put their ration of medical care to the best use and in presenting the Shakespeare reports to the lay press Mr. Ernest Brown, the Minister of Health, found an apt occasion to ask for public coöperation. He explained that more than a quarter of the doctors in general practice have been called up, those who remain being generally the older men. On an average over the whole of England and Wales there is now one doctor to about 2700 of population compared with one to 2200 before the war. As the call-up continues even this proportion cannot be maintained, though Mr. Brown thought we should still be better off than Germany where it is estimated one doctor has to look after some 12,000 of the civil population. Since the outbreak of the war well

over 10,000 doctors in Great Britain have joined the Forces, at least 1400 of them from salaried municipal appointments; and of the 19,000 general practitioners in England and Wales more than 4500 have left. The remainder are being exhorted to save time, before and tyres by limiting their spheres of action to a certain distance from the surgery. Something like 800 friendly aliens are authorised to practise here for the time being. Today the civilian doctor is more than ever a hard-worked man and Mr. Brown urged every citizen to become a loyal member of the Good Patient Movement. Dr. G. C. Anderson, secretary of the Central Medical War Committee, asked the public to translate their good resolutions into practice by calling the doctor early—early in the illness and early in the day, if possible not later than 10 A.M.; by sending accurate messages, giving an exact address and concise information about the illness; and, where possible, by visiting the doctor instead of asking him to call.

SIMPLER HÆMOGLOBINOMETRY

THE Haldane carboxyhæmoglobin method of estimating hæmoglobin has held the field in this country for a long time; the acid hæmatin methods, based on Sahli's original technique, have also been popular, especially among those who had not coal-gas readily available, and combined with glass standards in comparators they have the advantage of simplicity. Lately there has been dissatisfaction with the accuracy and comparability of estimations made in these ways, the main disadvantages of the Haldane method being the difficulty of preparing the standard carboxyhæmoglobin solution and of comparing shades of pink. Its accuracy is no doubt sufficient for ordinary clinical purposes and for use in investigations of changes in blood-volume in shock. The acid hæmatin methods also have snags, the most serious being disagreement about the time required for development of the optimum colour; it certainly seems to be long. When dealing with the grosser forms of anæmia, accuracy in hæmoglobin estimation is not very important, but interest is now being excited in the slighter degrees of anæmia. A fall in hæmoglobin level is one readily detected sign of incipient malnutrition, especially in women. Another use for a rapid hæmoglobinometer would be in assessing minor degrees of anæmia among blood donors. More accurate methods have been described, based on the use of the photo-electric absorptiometer. In these, since green light is absorbed by a red solution like oxyhæmoglobin, a constant source of light is used together with an appropriate green filter to pass a green light through the oxyhæmoglobin solution; the amount of light able to pass is measured by a photo-electric cell. The amount of light absorbed is proportional to the concentration of oxyhæmoglobin and thus it is possible to construct a scale from which the percentage of hæmoglobin can be rapidly and accurately determined. Instruments of this type in compact forms have been put on the market in the United States, but all photo-electric instruments are nowadays expensive and difficult to obtain here. The suggestion of Dr. D. H. Duffie[1] that the same principle can be applied to a *visual* instrument without significant loss of accuracy, and that the photo-electric cell is not essential is therefore timely. He does not claim that the method is new—Kennedy[2] described its use 16 years ago—but Duffie's apparatus consists merely of a green filter (Wratten 74) and a sliding optical wedge of neutral grey, a 20 c.mm. blood pipette, a flat-bottomed vial, and a 6 volt bulb run from a transformer or an accumulator. The blood is drawn and run into 2 c.cm. of 0·1% sodium carbonate or of 0·4% ammonium hydroxide, giving an alkaline hæmatin solution. If a set of estimations is being done, they can be collected into vials, corked, and read later. The green light illuminating the solution cup and the wedge gives the usual colorimeter type of field in two halves. By manipulating the wedge the two halves of the field are adjusted to equal brightness and from a scale the hæmoglobin content can then be read directly. That the technique is simple and accurate was shown by letting two school-children take readings; their results were satisfactorily close, and the scale is fitted with an occluder to prevent "wishful" readings. Duffie's short note leaves much unsaid: he does not, for instance, say how the instrument is standardised. But he has demonstrated that a simple, accurate, rapid and relatively inexpensive hæmoglobinometer is a practical proposition.

1. Duffie, D. H. *J. Amer. med. Ass.* 1942, **119**, 493.
2. Kennedy, R. P. *Amer. J. Physiol.* 1926, **78**, 56.

APHASIA IN THE DULLARD

EDUCATIONAL backwardness may be due to intellectual, emotional or physical causes. Dr. Macmeeken suggests[1] that the "core of stubborn backwardness in schools" is closely related to left-eye dominance as determined by sighting or directional tests of eyedness. There is a higher incidence of squint, accompanied as often by right-eye as by left-eye dominance, among retarded children than among the normal school population, and this like left-eyedness interferes with the acquisition of reading and writing. A syndrome found associated with left-handedness, though subtly different, is sufficiently similar to fit into a common wider background of anomalies of laterality. She quotes a suggestion by Travis that there is a connexion between sinistrality and abnormal fœtal position which, it is thought, influences the prenatal development of vestibular and vestibulo-ocular reflexes. In support of this Dr. Macmeeken quotes examples; one case is that of "a left-eyed aphasic boy who must 'yaw' when writing, who cannot do drill, who must tilt his head right back until he is looking at the ceiling in order to think out arithmetic problems, whose orientation is faulty." She considers that there are endless examples showing characters associated with abnormal fœtal position. In an earlier Ross inquiry, to which this is in part supplementary, Dr. Macmeeken noticed that all sets of twins in a school investigated belonged to families in which left-eye dominance and the so-called word blindness syndrome was found. Following up this line of investigation she found, in two of the three schools in which pupils were tested, 51 cases of lateral dominance and twinning associated with serious backwardness. The principal steps in the investigation were as follows:

Three schools reasonably representative of the Edinburgh primary public school population were selected. They served an artisan neighbourhood, a well-to-do suburb and a slum-clearance area. Out of the total group of 1487 children, 140 aged 7–12 years, 84 boys and 56 girls, were on the school register of seriously retarded children. These 140 children were tested for intelligence by the Terman-Merrill (1937) revision of the Stanford-Binet scale, for eye dominance by Dr. Macmeeken's cylinder test, and for hand dominance by the Van Riper test of laterality. Burt's reading and spelling tests were given to 82 of them. On the average these children were found to be working up to 88% of their capacity, their scores in the reading-spelling tests being to that extent inferior to their intelligence quotient. Where the accomplishment quotient (the relationship of educational attainment to the IQ) was less than 100 it was concluded that there was an extraneous factor hindering progress in reading and writing. She found a strong sex difference. Among girls low capacity was responsible for a great part of the educational retardation. Among boys most of the retardation was attributable to laterality.

Dr. Macmeeken remarks on the association of laterality plus educational attainment with defects of motor control in non-linguistic activities; useful data might

1. Developmental Aphasia in Educationally Retarded Children. M. Macmeeken, MA, BEd, PhD. Report to the W. H. Ross Foundation (Scotland) for the Study of Prevention of Blindness. London: University of London Press. Pp. 95. 3s.

be gained by giving standardised tests of motor control, such as those of Ozeretzki, to backward children. She notes the performance quotient obtained by giving the Drever-Collins tests to individual children, but has compiled no statistics of such quotients for the whole group of children showing laterality. Results would also have been interesting of a non-linguistic test of reasoning ability, such as the Raven progressive matrices which have been used successfully with deaf children. The investigation, indicating as it does the importance of an essentially physiological factor, offers scope for further study, and may have a practical bearing on educational method.

THE NEW CHAIR OF CHILD HEALTH

SOME £3 million a year are spent in this country on child welfare and about another £4 million on school medical services. The money devoted to the teaching of pædiatrics is by comparison negligible, yet about a third of the general practitioner's patients are children and the officers of the child public health services should surely be offered opportunity for postgraduate study. The money spent on research into the diseases of infancy and childhood is also infinitesimal, yet, as was suggested last week, we do not know nearly enough about how and why infants die. There is with reason a growing feeling abroad that to spend large sums on the study of the diseases of old age and so little on the diseases of children and infants is to begin at the wrong end of the stick. The Nuffield Trust—always sensitive to the stirrings of wisdom—has now come forward with a gift of £15,000 to the University of Durham towards the cost of establishing a professorship of child health at King's College, Newcastle-on-Tyne, and Dr. J. C. Spence's appointment to the chair is announced on another page. The university intend to provide him with the assistance necessary to create a full teaching and research department, and the Royal Victoria Infirmary and the Babies Hospital will join with King's College in providing facilities for the new department, which will also be at the disposal of local public health and education authorities for advice and consultation on the conduct of their child welfare and school medical services. In the region's varied populations—urban, mining, industrial and rural—Dr. Spence and his assistants will find comprehensive teaching material and opportunity for varied field-work.

BLOOD-VESSELS AND THEIR ENVIRONMENT

Prof. René Leriche,[1] working now far away from his famous clinic in Strasbourg, has been studying the behaviour of blood-vessels in response to pathological environment. He reviews vasodilatation in its clinical bearing on the symptoms of cervical ribs; on resection of arteries; on sympathetic nerve resection; and particularly on the enlargement of vessels in the neighbourhood of arteriovenous aneurysms. Inaccurate observation and inaccurate description have often given the impression that the vessels below an arteriovenous fistula dilate passively in response to increased intravascular pressure. Leriche confirms what is really apparent in some of William Hunter's original descriptions—that the enlargement is one of length as well as of breadth, and is associated with hypertrophy of all the coats of the vessel. It is no localised sac-like dilatation; moreover it can affect the vein as well as the artery, and it can hardly be conceived that the pressure conditions within the vein tally with those in the artery. So enormous may the dilatation be that Leriche has seen a case in which the iliac vessels formed a tumour in the iliac fossa suggestive of an ovarian cyst. No purely mechanical explanation will suffice to account for the long, tortuous, serpentine vessels found in such cases. That the pressure is raised in the artery below the fistula is obviously not the whole explanation. The aneurysmal dilatation of the subclavian artery sometimes found in proximity to a cervical rib is another example of the same process. The structure of the whole vessel is affected, but the condition is not histologically an aneurysm: it is not a local dilatation due to weakness of one coat of the artery nor does it behave clinically like an aneurysm—after removal of the rib there is no progressive dilatation because the wall of the vessel is not weakened. Leriche does not believe in a mechanical origin of the lesion, but regards it rather as a local vasomotor effect. He has improved the circulatory symptoms greatly by periarterial sympathectomy, in one case with associated lessening of the dilatation, and in another with its disappearance. The change in the artery is to be regarded, he thinks, as physiological rather than anatomical. Leriche describes a case with rapidly progressive symptoms of Raynaud's disease in one upper limb; radiography revealed a cervical rib which was removed, and at operation the subclavian artery was found to be much dilated. Arteriography, by thorotrast injection, showed that the brachial artery was not patent. The operation did not relieve the vasomotor attacks, whereas a subsequent resection of the obliterated segment of the brachial artery, combined with a periarterial sympathectomy of the brachial below this point, was followed by recovery. This case demonstrates that a localised arterial lesion can produce a distant lesion which may actually lead to obliteration of the distant vessel. The vasodilator effect of sympathetic section is commonly supposed to be due to a paralysis of the vasoconstrictor mechanism; if this were so one would expect to find depression of the circulation in the affected part. Leriche confirms Claude Bernard's observation that the effect, far from being paralytic, is an enhancement of the circulation. He finds further support in the experiments of Fontaine who demonstrated by arteriography after thorotrast injection that unilateral lumbar sympathectomy in a dog caused greatly increased arterial circulation on the resected side as contrasted with the intact side. Leriche, however, warns us against too easy comparison between the quick acting effects of experimental vasodilatation and the slow acting conditions of pathological environment; there is no real analogy. A pathological environment gives time for active vasodilator substances to come into play, and Leriche rather favours this possibility. His most notable conclusion is that the vascular system is a physiological entity which acts as a whole. When one part is touched distant parts will respond. "Life does not admit of the division into the compartments of our textbooks."

1. *Amatus Lusitanus, Lisbon*, 1942, **1**, 137.

CHEMOTHERAPY OF COMMON FEVERS

STREPTOCOCCI and pneumococci play such important rôles as secondary invaders in the specific fevers that the possibility of control by chemotherapy has attracted many investigators. Telegdi,[1] presumably in Hungary, has treated 1310 controlled cases of measles, scarlet fever and influenzal pneumonia with sulphathiazole and obtained good results in all three infections. The mortality from influenzal pneumonia was reduced, particularly in the upper age-groups. In measles, the incidence of pneumonia and middle-ear disease definitely decreased—a prophylatic result which now appears fully attested. No effect was expected on the initial toxæmia of scarlet fever, so that combined treatment by chemotherapy and specific antitoxin was used. Telegdi claims to have influenced particularly the onset, course and duration of ear complications. There is little doubt that established middle-ear disease in scarlet fever is amenable to chemotherapy. Whether chemotherapy can prevent otitis is less certain, the preventive value of sulphonamide drugs in scarlet fever having now been almost equally supported and contested by different observers. On the whole, there seems no clear indication for routine chemotherapy in scarlet fever as long as it retains its present mild character.

1. Telegdi, I. *Klin. Wschr.* 1942, **21**, 300.

Special Articles

THE CANCER ACT*

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THE application of the Cancer Act of 1939 in the immediate postwar years promises not only to have a profound influence on the evolution of radiotherapy but to affect the organisation of surgery. Under the act every local authority becomes responsible, in regard to patients suffering from cancer, for seeing that the following are provided: diagnostic facilities; adequate and efficient treatment both by surgery and by radiotherapy; a follow-up scheme with the necessary statistical records; suitable popular education or propaganda measures. It is also indicated that authorities should collaborate in joint action and with such existing organisations as already provide facilities either wholly or partially.

Before reviewing the methods by which these needs may be met, it is necessary to assess the number of cases likely to be involved. Such an assessment is possible in malignant disease because the yearly incidence of cancer is remarkably constant, not only in total numbers, but in the numbers of each type of cancer. We are therefore in a position to forecast requirements and to plan accordingly. In table I such an analysis is attempted, aiming, where numbers depend on calculation, at overestimate. The Registrar-General's reports have been used for basic figures. I have had to make a personal estimate of the situation as regards treatment. Such a table can only be approximate, but it gives a good general idea of the problem. The table is based on two assumptions: first, that the best surgical and radiotherapeutic methods will be made available to all, but with no revolutionary improvements in their scope or effectiveness; secondly, that, short of a systemic test for cancer similar to the Wassermann, diagnostic achievement will not appreciably exceed that of present day work in good hospitals. As will be seen from the numbers given in the table, this second assumption recognises that many of the common cancers, such as cancer of the stomach, will continue to be untreatable from the moment the patient is first diagnosed. I do not feel that any form of organisation or of propaganda will alter this. In terms of numbers for treatment, it is the four "accessible" cancers which are of greatest importance.

Table I shows the maximum number of new cases per annum which will require treatment in a population of a million, and how they will be treated. Column 1 shows the number of cases. The number of registered cancer deaths is about 1650 per million per annum; one may reasonably add something of the order of 20% to these figures for failure of accurate certification and to allow for treated cured cases—at the present time a very low figure if taken over the whole population. This gives us a reasonable estimate of the total number of new cancer cases per annum per million as 2000, divisible as to types in the ratio of the Registrar-General's figures for cancer deaths. It is often argued that at any moment there are at least one and a half, if not twice, the number of cancer patients in existence as are diagnosed each year. This is true but does not alter the fact that it is the number of new cases each year with which any organisation will be called upon to deal.

Calculation of the fraction of new cases which will be amenable to active treatment is a harder problem. Sholto Mackenzie [1] (now Lord Amulree) arrives at the number of cases of each cancer type actually receiving treatment in the country in the prewar years (column 2). It is probably safe to estimate that we will overstate the needs for the first 5–10 years of improved organisation if

* A paper read before the Faculty of Radiologists on June 6, 1942.

1. Mackenzie, B. W. S. *Rep. publ. Hlth medical Subj., Lond.* 1939, No. 89.

TABLE I—ESTIMATED NUMBER OF NEW CANCER CASES PER ANNUM PER 1,000,000 POPULATION; PROBABLE ALLOCATION UNDER ADEQUATE ORGANISATION, WITHIN THE LIMITS OF EXISTING DIAGNOSIS AND TREATMENT

Site of cancer	PRESENT SITUATION		No. per million for treatment under improved organisation	PROBABLE ALLOCATION FOR TREATMENT							Untreated (or placebo)
				Surgery—				Radiotherapy			
	Deaths per million pop. (plus about 20%)	Percentage now treated ‡		Radical	Palliative	On cases primarily radiotherapeutic	Found untreatable at operation	Radical	Palliative	On cases primarily surgical	
Curable											
(*a*) Mainly surgical: Breast ..	208	68	208	108	0	10	0	50	50	70	0
(*b*) Mainly radiotherapeutic:											
Mouth	77	71	77	5	0	20	0	45	27	1	0
Uterus	133	56	133	12	0	0	0	103	18	2	0
Skin * and lip	42	64	42	20	0	2	0	20	2	2	0
Genitalia	26	50(?)	26	8	0	0	0	8	10	1	0
	486	..	486	153	0	32	0	226	107	76	0
Treatable											
(*a*) Mainly surgical:											
Stomach	382	5	38	20	18	0	80	0	0	0	264
Colon	268	8	43	20	23	0	40	0	0	0	185
Rectum	168	20	67	30	30	0	0	0	7	10	101
Bladder and prostate ..	105	22	46	13	7	10	20	13	13	5	39
Ovary	50	29	29	16	0	0	0	0	13	5	21
(*b*) Mainly radiotherapeutic:											
Pharynx and larynx ..	50	39	39	5	0	0	0	18	16	0	11
(*c*) Other sites †	118	42(?)	99	24	25	0	0	25	25	0	19
	1141	..	361	128	103	10	140	56	74	20	640
Hopeless											
a) Worth palliative treatment:											
Œsophagus	72	21	30	0	15	0	0	0	15	10	42
Lung and mediastinum	125	7	18	0	0	0	0	0	18	0	107
(*b*) Seldom worth treating:											
Other abdominal (liver, pancreas, gall-bladder, &c.)	176	2	7	4	3	0	30	0	0	0	139
	373	..	55	4	18	0	30	0	33	10	288
Total	2000	..	902	285	121	42	170	282	214	106	928
				618				602			

* Excluding basal cell carcinoma. † Estimates only. ‡ Taken from Mackenzie's figures.

we take twice his percentages as our indicator—with 100% maximum of course, since more cases cannot be treated than occur. The resultant numbers for treatment are shown in column 3. Then follows a section, showing probable methods of treatment under a well-organised scheme; to arrive at these estimates, I considered each disease separately and reviewed my own fairly extensive experience of present treatment methods in the light of the annual figures of the Radium Institute, Manchester, where a large part of the radiotherapy for a population of about five million is undertaken. In the table rodent ulcer is entirely omitted, since it is difficult to arrive at any figure for this disease. Any unit, however, will be called upon to treat a number of rodent ulcers as well, usually by simple methods in the out-patient department.

I have suggested the classification into three groups before.[2] The curable cancers are those for which cure is possible in a worth-while percentage of all cases and in a high percentage of all early cases treated; the treatable cancers those in which cure is only achieved in a low percentage of all cases but in which treatment is essential in a moderate fraction. The incurable cancers are those in which palliative treatment may be of some value, but cure is rare and likely to remain rare with present-day knowledge and diagnostic facilities. The incidence and treatment of cancer per million population may be summarised in round figures from table I as follows:

Incidence	
New cases per annum	2000
Untreatable from first diagnosis	900
Lengthy investigation, but not treated	>200
Maximum number requiring active treatment	900
Treatment	
Radical surgery	300
Radical radiotherapy	300
Palliative treatment	300
Cases needing some surgical treatment	600
Cases needing some radiotherapy	600
Beds required	
Average 4 weeks per patient, 900 treated	70
Average 2 weeks per patient, 200 investigated but not treated	10

It shows lack of realism not to admit that in the disease group generically called cancer there is still a large fraction which is incurable; nor is there any hope that this will be changed, except by some genuinely revolutionary discovery. On the other hand, the established achievements of surgery and radiotherapy give us weapons by which some types of cancer can be cured if treated early and effectively. Success or failure depends largely on the first main treatment; salvage from second or third attempts is very small. To anyone familiar with what is happening today it is apparent that *effective* treatment in the *early* stages is the exception rather than the rule. Two factors contribute to this failure. First, delay in the patient's transit to treatment; he may delay in seeking advice through fear; his practitioner may delay through lack of experience of the symptoms or appearance of early cancer; and the hospital waiting-list may cause delay in admission. Secondly, cancer is still looked upon as merely one of the diseases—almost as one of the chronic diseases—included in the scope of general medicine and surgery. Few consultants concerned with either its diagnosis or treatment have any extensive experience of its particular problems. The method of treatment to be adopted is determined far more by the fortuitous accident of the type of consultant to whom the patient is referred than by any adequate consultation machinery; and execution is seldom in the hands of anyone with bulk experience of a particular technique.

If improvement is to be achieved, two general principles must be accepted in whatever organisation is built up: that once cancer is suspected, action must be immediate; and that all specialists concerned with diagnosis and treatment are engaged in cancer work to such an extent that they really have special experience of that group of diseases. The second can be realised only by the creation of a special cancer organistion to coördinate work in such a manner that adequate numbers of patients will be seen and dealt with as one group. This would also make it possible to segregate enough radium and X-ray plant for the necessary flexibility in treatment methods. But the most important argument lies in the gain in bulk experience of the specialty by a limited number of people. The whole scheme would benefit if each of them was engaged in cancer treatment or diagnosis for at least half his working time.

THE CANCER UNIT

It is, I think, inevitable, that the treatment of cancer will become a specialised branch of medical practice, like the treatment of tuberculosis and, to a lesser extent, of venereal disease, and no doubt objections will be similar to those raised twenty years ago against the inception of tuberculosis services. If we disregard these, how could this specialty be organised to produce the best results and perhaps some visible impact on vital statistics? It is this ultimate structure which we should visualise now, as a guide in the transitional period.

The cancer unit may take the form of a specialist hospital or be a department of a large general hospital, usually the teaching hospital of an area. The general hospital is to be preferred on many grounds, provided that the cancer department has a distinct organisation of its own, separate from the hospital, on which local authorities and other hospitals are adequately represented. From each million of the population, a cancer department will treat about 900 new cases yearly and will, in addition, admit a number of cases for investigation only. A million should be regarded as the minimum population which will carry a really efficient organisation. The bedrock minimum must be set at half a million, and then only in geographically detached areas. Efficiency probably steadily increases up to at least two million, since this allows for the maintenance of junior and senior medical officers in most of the specialties concerned, with sufficient material for each.

The two main sections of the cancer hospital will be the radiotherapy section, and the surgical section in which will be included the various collateral specialties: gynæcological, laryngological, genito-urinary, &c. Of the 900 new cases per annum per million it will be found that, allowing for a number of cases treated by both surgery and radiotherapy, each section will be called upon to handle about 600 cases per million population served. Diagnostic services will include radiodiagnosis and pathology, although they may be combined with the corresponding departments in the general hospital.

The unit must finally come under one director. In the period of development, however, there is much to be said for the two sections being separate, even to the extent of each having its own director. Such directors must be of equal status, and must work together sufficiently to have some knowledge of each other's results; both must be members of the executive of the governing body, and each must have enough beds under his own control. The position and status of such director has been well outlined by Professor Platt.[3]

Radiotherapy section.—It is impossible to have any separation between radium and X-ray therapy, and both must be in the hands of the radiotherapist. Trained therapists of today have been recruited about equally from surgeons with an interest in radium, and radiologists interested in deep therapy. Each type of recruit has had to learn the other half of radiotherapy. New recruits must in future train in already established radiotherapy centres. Transference of control of radium work from surgeons to therapists in the major centres in this country is well on the way; only in backward areas or undeveloped centres is radium therapy still a surgical preserve. There must be a similar transference of control of X-ray therapy for malignant disease from the radiodiagnostician to the radiotherapist. This is somewhat further from accomplishment; most radiologists in the larger centres now realise, however, that this transference is inevitable and in the best interests of the patient, and are choosing which half of their work they will retain. Partly as an expression of this essential split and partly as a step in the aggregation of X-ray therapy plant into departments with multiple units, the various 200 kV deep therapy plants now scattered broadcast over the

2. Paterson, J. R. *Brit. med. J.* 1929, ii, 904.

3. Platt, H. *Lancet*, 1942, i, 179.

country in single units should be concentrated into major treatment centres.

Surgical section.—In contrast to radiotherapy, which is now partly centralised in many areas, the present surgical treatment of cancer is everywhere included with general surgery. This decentralisation, with its consequent lack of adequate numbers of cancer cases for each surgeon, is found both in the large teaching hospitals and the smaller hospitals. Plans to centralise into one cancer unit with a limited staff will therefore meet powerful opposition at first, which will be augmented by the desire of the smaller hospitals to remain independent of the large general hospital to which the cancer unit may be attached. Two expedient interim policies may be considered:

1. All cases could be collected at the central teaching hospital but the general surgical organisation there could be left unaltered and the cases could be spread over the various surgical and specialist units.

2. The right of autonomy in this matter should be conceded to the better organised hospitals, whether teaching or not, but they would be expected to work towards a segregation of cancer cases, and their distribution among a limited number of the members of each staff.

The second is both the juster and the more effective and would enable a number of surgeons and specialists to give a large part of their time to cancer work. Payment would be either directly, or indirectly, from the local authority under the Cancer Act. The ideal, however, remains complete centralisation of cases in the surgical section of a separate cancer department or hospital, with a selected staff, limited in number but genuinely experienced. The number of patients requiring treatment per million population gives the clue to the number of specialists needed. In a centre serving a million population one, two or, at the most, three general surgeons will be required, but only one representative of each of the other specialties, with resident or other junior assistance. Even where a unit is serving two or three million, the necessary additional members of staff should work directly under the man in charge of a particular specialty and not be additional officers of independent status.

DIAGNOSTIC SERVICES

Difficulties of distance should not be made too much of when considering centralisation; they can be surmounted. To reach the cancer case at an early stage the key-note must of course be decentralisation in the geographic sense, but not as regards personnel. Multiple clinics must be established. For treatment, the association of a hospital with the idea of cancer cannot be avoided but it is important that these outside clinics are neither called, nor even become known as, cancer clinics. The only way to avoid this is to incorporate them in the existing outpatient services. This usually means that they will be held at voluntary hospitals; they might be called tumour clinics. In

TABLE II—NUMBER OF CASES PER MILLION FOR DIAGNOSIS
(based on 150% of numbers treated)

Group 1		Group 2		Group 3	
"Spot diagnosis" Lesions visible or palpable		*Radiological* Diagnosis mainly by X rays		*Technical* Diagnosis mainly by special exam.	
Breast	312	Stomach	177	Pharynx and larynx	59
Mouth	116	Colon	125	Bladder	99
Skin	63	Œsophagus	45	Uterus (¼ of cases)	67
Uterus (¼ of cases)	133	Lung	27	Ovary	44
Genitalia	39	Bone	45(†)	Brain	45(†)
Rectum	100				
Totals	763		419		314

table II the basic figures from table I are presented again from the diagnostic angle. Allowance must be made for cases examined but not treated, either because they are non-malignant or are too advanced for treatment. A more than adequate approximation will be to take 150% of the numbers likely to come to treatment. Groups 2 and 3 will for the most part require admission to hospital for the necessary diagnostic procedures. The clinic medical officer has therefore only two tasks to perform: to recognise as probable cancer any lesion which he can either see or feel (a biopsy being made in doubtful cases except in breast cancers); and to recognise the type of symptom-complex which merits special admission for investigation as potential cancer. This is not a task which calls for a team of specialists. It can be done by one man, provided that he has experience and is doing a lot of it. In a completely centralised cancer service it is unimportant whether he be a surgeon, radiotherapist or physician. During less centralised interim organisation, where radiotherapy is arranged by collaboration with a local hospital surgical service, it would be best that a radiotherapist should be in charge of the clinic because he will also have the responsibility of deciding, in collaboration with the local surgeon, between surgery and radiotherapy. In about half the cases, including most cases of cancer of the cervix uteri, the diagnosis can be made by an experienced observer merely on sight or by simple palpation. The other half of the cases will need admission to the central unit for examination, and it is at this stage that team collaboration becomes important. From study of the types of case seen it is clear that consultation not between a whole board of examiners but between two people will generally be what is needed—usually between the radiotherapist and either surgeon or specialist or, less often, between the surgeon and a specialist. Planning in the hospital should therefore cater for this two-person consultation. Once diagnosis and treatment have been agreed on, the case should pass for the time being into one person's hands, as his exclusive clinical responsibility, and further consultations will be sought as they are indicated.

One person should also be allocated to pathological work and become highly experienced. This is possible even if the work is done in the general pathological laboratories. In many cases the pathological decision will be a key decision.

Where a clinic is at a distance from the treating centre, follow-up examination will also be carried out at the clinic. The visiting clinician must therefore be familiar with the points to look for in treated cases. It may be argued that cases are thus lost for study by the people responsible for their treatment, but the clinic held at the centre itself is bound to be the largest, and will provide a sufficient sample for study; in addition, a good records system puts the entire clinical material at everyone's disposal. Diagnostic clinics must be so widely distributed that no patient faces difficulties or hardships in getting to them. Clinics should be held at least fortnightly at each place.

EDUCATION AND PROPAGANDA

The first essential of any propaganda scheme is that it shall be simple and driven home by constant reiteration. There are four curable types of cancer (breast, mouth, skin and cervix uteri); treated early these diseases are curable in 80% of cases; treated late in barely 10%. Diagnosis is not really a problem—the growth can be seen or felt. The key sign or symptom of each disease at its early stages can be described in two or three words:

Breast.—Take thought for a lump in the breast.

Mouth and skin.—Get advice about a small painless sore which does not heal.

Cervix.—Bleeding after the change of life is dangerous; before the change irregularities must be investigated.

In no other types of cancer will education or propaganda, apart from improvement in medical education, have any really great influence. In stomach cancer—the great killing cancer—the disease is often advanced at the time of the first definite symptom. I believe that it is only in the four accessible cancers that, through propaganda, we can sensibly lower death-rates. Nothing medicine has done so far as had the least visible effect on cancer death-rates. My plan would be to harness the propaganda organisation to one task—that of putting across to the public the key symptoms of these four diseases. If we found that we could alter the vital statistics of these diseases we would know that the methods had been successful. When any other type of cancer became controllable a practised organisation would be ready to spread the information.

THE LATE CASE

What about the late cases—either untreatable or after treatment has failed? They must not be dealt with

in the same wards as cases undergoing active treatment. Should they go into "cancer hospitals" to die? Most of them would be happier if nursed in their own home, and it would be a fine addition to the Cancer Act if some effective scheme of home nursing could be devised and carried through by local authorities; it would need to be a much more elaborate scheme than the daily visit of a district nurse. Nevertheless, it is important both from the social and from the humanitarian point of view.

WHO GETS THE LION'S SHARE?

IT is reasonably easy, under a rationing system, to assess the average share of food bought for a family every week; but who eats what, at the family table, is often settled more by custom and tradition than by individual need. Mr. F. Le Gros Clark has made a study [1] of food allocation in 40 working-class households in respect of meat, cheese, fish, eggs and milk—that is, of first-class protein. He finds that the old belief is still prevalent that the wage-earner doing vigorous work needs meat or its equivalent: so that the father generally gets more than his ration of meat, cheese, fish and eggs, and the mother and children go relatively short. Milk, however, is well recognised as a food for children, and they get the lion's share of that. Le Gros Clark's inquiry was made in Edinburgh by an experienced social worker who was on familiar terms with most of the housewives. In order that the replies should not be coloured in any way the housewives were told that a study was being made of the relation between home and communal catering.

The 40 families, all of which included children, were visited during the winter months of 1941–42. There is no evidence that except in very low income families any member of a household normally goes short of calories; and vegetables, when bought, are thought to be fairly evenly shared out. The inquiry was therefore confined to animal protein. The foodstuffs investigated were all rationed, or virtually rationed, at the time of the inquiry, with the exception of fish which was not bought by all. Of the fathers, 5 were builders, 6 brewery workers, 6 labourers in various trades, 2 engineers, 3 motor drivers, and 2 engaged in civil defence; 4 were unemployed, and the remainder had jobs about the docks, or were employed as shop-assistant, miner, and so forth; in 3 instances the mother was the sole wage-earner. The average size of the family—considerably above the average for the country as a whole—was nearly 6 members.

Cheese was bought by 36 families; 18 declared that they divided it equally among the members of the household; 9 allocated all, or nearly all the cheese ration, to the grown men in the family, usually in the form of "lunch-pieces" to take to work. In the remaining 9 families practice varied. There is a long-standing tradition that men and cats like cheese, but that it is bad for children. That even young children benefit from cheese and cheese-dishes is a notion that is only slowly gaining ground. Thus there is a heavy barricade of custom to cast down before cheese gets more fairly distributed in the family.

Eggs stand in a different category: they are recognised as being good for the child, but at the same time the wage-earner often fancies an egg to his tea. The outcome, roughly, is that the father gets his share, or more than his share. Eggs of course have been scarce, but the average allowance was one egg per head per week. Most fathers contented themselves with a single egg, but in 2 families the father took no eggs, and in 9 families the father got two eggs or more, partly because eggs like cheese are handy for a carried lunch. Of the mothers 7 gave up their eggs either to the father or the children, and the rest ate their ration, with the exception of 2 who admitted exceeding it. In 27 of the families, then, the eggs were equally shared; in 33 the children received all or more than their share. On milk, too, the children did well. The mothers relinquished milk to the children almost automatically: thus in 38 families the mother was getting less than half a pint daily, and this includes 3 who were pregnant; in 10 families where the mother took hardly any milk the children were getting well over half a pint each at home, and more at school. One of these mothers was breast-feeding a child. The fathers, too, took little milk; they were as abstemious in this respect as the mothers.

Meat, however, was a different matter. In many cases nearly half the family meat ration (not a very large one in any case) went to the father, and some had three-quarters of it or more. Those who received such large proportions either had some of it in the form of lunch-pieces or were convinced that they needed it in order to perform their daily work. Children under five get little or no meat, though they get gravy on potatoes. Nearly half the mothers were getting less than a fair share of what remained when the father had taken his whack; and the children between 5 and 18 were getting perhaps 70–80% of their official ration. Fish was only bought by 19 families, but in those the father, though he had a large helping compared with other members of the family, did not exceed all bounds, and the mother and the growing children did fairly well.

The estimates are admitted to be rough, but if it is accepted that about half the daily protein intake should be in the form of animal protein, then the average father in this small group of working-class families seems to be getting more than half his daily protein in that form, the mother and children less than half. Adolescent children need more animal protein than their fathers if growth is to be normal—an idea which is still quite foreign to most working families. In practice, however, many children of school age were getting school meals in addition to their food at home, and this brought their animal protein intake up to a proper level. The mother's diet and those of children who have left school are more likely to be defective. Le Gros Clark suggests that public attention should now be concentrated on the diet of young people between 15 and 25, especially the girls, who are apt to go short in favour of their brothers, and who seem, in the words of the Edinburgh investigator, "to be having a particularly lean time in almost nine cases out of ten." There is more than a suspicion that the rationing of animal proteins has told especially against those who are at the most vulnerable age for the attacks of the tubercle bacillus.

A breakdown of the tradition that the worker needs the lion's share of meat could probably be achieved by propaganda and extended health teaching both over the air and by health visitors in the homes. The factory canteen and the school meal, by replacing the lunch-piece, can release first-class protein for a fairer distribution at the family table. Le Gros Clark's findings, he is careful to point out, must not be given more statistical significance than they will bear, but they pave the way for extensive inquiries along the same lines.

1. From the Children's Nutrition Council, 6, East Common, Harpenden (Herts). 1s.

In England Now

A Running Commentary by Peripatetic Correspondents

THE story really started one afternoon in the early spring of 1941. In Sister C's off-duty time she was discovered digging a small parcel of ground outside the door of her ward—one of the many huts of our "upgraded" hospital. Soon, between some old apple trees, she had raked the surface to a fine tilth, and was busy sowing beans, shallots, peas, radishes and (with an eye to future ward decoration) clarkia, cornflower and other annuals. Some superior people smiled, but when later on the results of her efforts appeared on the sisters' mess table at dinner she received much approval. The beans tasted a treat. This spring, one result of her pioneering was that several more sisters were smitten with the desire to dig for victory. Trowels, forks and spades were purchased or borrowed, a convalescent patient—a gardener—was appointed acting unpaid consultant in horticulture, and soon evidence was to be seen of the enthusiastic labour that was going on. The epidemic spread. The office boys appeared with two sticks and a ball of string, the RMO and the steward presented blistered hands and were heard to wonder whether backache would respond to radiant heat, the almoner took a hand in staking a claim outside her sanctum, the X-ray department joined forces with the masseuse, and even our military wing commandeered the ground around their sentry-box and sowed garden peas in mass formation. Then a chance remark one evening bore fruit: we must have a vegetable show in the summer

We discovered that among our latest joined housemen was one who had won prizes long ago in real horticultural shows. Moreover he has a flair for running things and knew just what was wanted; and so competition was stimulated and gardening almost ousted shop as the major topic of conversation at meal-times.

The great day arrived last Saturday. We had twenty classes, eighteen for vegetables, one for a bowl of wild flowers and one for the best arranged vase from a ward. The entrance fee was 3*d*. for each entry; prizes were to be war-savings stamps. Each entry had two classes, the first was open to the produce from the gardens or allotments of any member of the hospital, the second was confined to produce from the hospital grounds. A panel of judges was formed by two friends in the neighbouring town, the lecture theatre was cleared and the exhibits placed on view. After the judging had been done the show was thrown open and the delighted prize-winners pocketed their stamps. One of the judges confessed that he wasn't quite satisfied with the award in the shallot entry; however the decision was confirmed when our oldest porter was heard to declare that the prize had been won by the firmest and most shapely shallots—"I reckon the judges couldn't 'a done otherwise." X ward sent a message to the kitchen yesterday: Don't send any green vegetables today; we are going to eat our own."

* * *

It so happened that I entered my 70th year just as the world crashed into war. Naturally I wished to place such knowledge and experience as I had accumulated at my country's disposal, but wherever I applied I was made to realise with varying degrees of courtesy that I belonged to the past; for an epoch had suddenly closed. Whatever the future of medicine may be I shall be a stranger and have no part in it. I am forced to become a member of that lowest and most despised class—the rentiers. That is to say I am living on what I laboriously saved from years of practice and not on a pension provided by a grateful state. Already I seem to hear "definitely Edwardian—believes in evolution and the law of progress and won't realise that Marx and Engels enunciated the only true principles of science: quite moth eaten." I sometimes wonder, however, whether the "safety first" attitude of the planned future will quite compensate for the sense of adventure in the old days. Perhaps even that seems more pleasant in the retrospect than it did at the time. Anyhow, physicians will live differently in the future; even before the war the Harley Street district was becoming a hive of accommodation addresses. They will have the same experience as the Royal Academicians who no longer live in stately houses in Melbury Road or Grove End Road. The total sales at the Academy this year did not exceed the income of a single popular Victorian painter. Whether their art was worse than that of the present remains a moot point. Nevertheless "cheerfulness will keep breaking through," as I philosophically retreat into the background, where the past becomes more and more real, draws nearer and catches me up, preparing to engulf me in it.

* * *

When Newton saw the apple drop, a sudden thought as light from Heaven. . . . Bosh! The idea had been bobbing about in his head for years. Thought may sometimes be a reflex from outside, but one of that complexity must have been long woven in the fibre and pattern which is continuous from the baby's touch-taste thoughts to the dying man's frayed memories of his prime. It may have reached verbalisation point then, but far more probably Newton had to dramatise the whole affair to get his point over to others. In my insignificant sphere I can sense several natural laws, but have not the mathematical ability to formulate them. There's Jones's Law, for instance. J used to be our bank manager—level-headed, safe, conventional, churchwarden, absolutely trustee stock. But when the blitz came he went all to bits and it then dawned on me that he had been walking on a tight-rope, he hadn't dared step off the straightline, that stiff conventionality was a protective mechanism, a path for a frightened soul, whereas our eccentrics have shown a great resilience to Fate's war-time rebuffs. Now I feel sure that this little truth could be suitably expressed in terms like the square of the conventionality is in inverse proportion to the coefficient of sanity. If I worked it out it would be sure to come out wrong, as my sums always did and I should as usual find that X equals Y—i.e., that eccentricity and sanity are equal, which is absurd; or isn't it? Then there's Brown's Law. Miss Brown gets a lot of pain for which I have never been able to find an anatomical basis. As a rule when patients use words like terrible, agony and writhe we conclude that they are trying to impress us rather than be strictly truthful, and Miss Brown is very lavish with such. Objective descriptions of pain have characteristics of their own, Osler's of his renal colic, and Ernest Waggett's of his endarteritis obliterans are good examples; they are meticulously boring like the golf bore's account of how he did the 5th in 4. Now the unit of pain is like the philosopher's stone; pharmacologists have tried to measure it by burning standard holes in their foreheads, schoolmasters in strokes of a cane, humorists in foot-pound hells (1 lb. dropped on the foot from 1 ft.), but they all come to grief because they are trying to measure two things—stimuli and receptivity. But here is a method that measures both together. Pain is in inverse proportion to the vividness of the description, or to the square root of the adjectives, or directly proportional to its boringness. Unfortunately another element of receptivity comes in, the listener's, for some people are more easily impressed or bored than others, and vary at different times of the day. Then again before one got one's formula one would have to apply a coefficient of taciturnity and verbosity and meiosis for each patient. On the whole perhaps we had better leave Brown's Law for a second Newton.

* * *

It fell to my lot a few weeks back to go down to the local station and meet the train bringing my daughter and elder son home for the holidays from their respective boarding-schools. The baby, of course, insisted on accompanying me, and the train was exactly an hour late. During that hour I was asked a vast number of technical questions about railways which I couldn't begin to answer, had to climb into various stationary and unclean trucks in sidings, explore and re-explore the "Gentlemen" and the small, bare waiting-room, cross the bridge over the line a dozen times, admire all the posters and hear their captions laboriously spelt out. When the train arrived at last it proved to be packed with supercilious-looking children of both sexes. My own pair, blinking owlishly in the corridor, evinced no disposition to get out until strongly exhorted by me to get a move on. When finally goaded to action they attempted to leave the train through a window. "Is this all the luggage?" I asked. "There ought to be a trunk somewhere," said my daughter vaguely. An obliging porter hastened towards the guard's van. "It *might* be up in front," she added as an afterthought. "All right," I said. "Hold on to the baby while I go and look." My elder son, carrying a bag in either hand and a tennis racquet between his teeth, began to follow me up the platform. "Don't follow me, you chump!" I yelled. "Stick those things in the car." The car was at the station gate in full view and not ten yards away. After a fruitless search the porter and I rejoined my daughter, who had, of course, let go of the baby. He, still thirsting for information, was lying prone on the platform with his head between the wheels and earnestly inspecting the underside of the train which was due to draw out at any moment. The trunk turned up on a later train and it was my privilege to go down and fetch it. Exponents of the boarding-school system of education stress the sturdy independence and self-reliance it teaches. I sometimes wonder. Insouciance would, I think, be a better word.

* * *

She is a shy, middle-aged, bespectacled spinster who keeps a wool-shop. To look at her you would say that her main interest in life was knitting. I was asked to see her because of a return of a tiresome blepharitis which she has had on and off for years. "I think it's all due to my hobby," she said. "Knitting?" I asked. "No-o," she laughed, "my real hobby—racing motoring. I used to do a lot of it at Brooklands and that's when it started." Life is full of surprises.

* * *

I was sitting in Christ Church meadows waiting for an exam—the very one in which we all slipped up

about gangrene (*Lancet*, 1942, ii, 168)—and trying to read through my notes for the last time. The mind is very divertable in such conditions, and it was not surprising that I started to notice the heifers. They exhibited the girl-school mentality to a T. At first they were crowded under one of the five possible trees where there was some shade, all milling around to get near the prefects in the middle. Then some riotous girl set off for another tree, and at once, jumping and giggling, the whole herd streamed after her, unable to run without lifting their tails vertically into the air. They crowded under this tree. "Come on, Susan," said another heifer, "let's go off by ourselves"—and off went a white and a brown one, pursued by the whole boiling. Three times they streamed round the whole vast extent of the meadows, tails in the air. Susan, who was intelligent, knew it was a mistake, and turned to say so. She saw the thundering herd, staggered, swung round, and galloped for her life. As I got up to walk grimly to the Taylorian, they were still galloping, their tails still raised, a few dim-wits lumbering along behind without the least idea of purpose but determined, come what may, to go where Susan led.

Letters to the Editor

DIAGNOSIS OF INTESTINAL INFECTIONS

SIR,—Flight-Lieutenant Vaughan's letter of Aug. 29 (p. 265) on the viability of the dysentery bacilli in fæcal specimens prompts us to submit a few germane observations. We had already satisfied ourselves (Cruickshank, R. and Swyer, R. *Lancet*, 1940, ii, 803; Hynes, M. *J. Path. Bact.* 1942, **54**, 193) that the Sonne bacillus will survive for several days in fæces or rectal swab dipped in saline agar at atmospheric temperatures of 15–20° C. In the spring of this year we had the chance to carry out similar tests on the viability of the reputedly more delicate Flexner bacillus. Six positive fæcal specimens from different patients were kept on the bench (T. 15–18° C.) and plated daily on desoxycholate-citrate agar; in one the organism died out after 5 days, but in the remaining specimens the survival times were 8, 8, 15, 15, 15 days when further culture was stopped. Similarly, five rectal swabs kept moist in saline agar were cultured daily, and the average survival time of the Flexner bacillus was 11 days. Four positive fæcal specimens were divided, one portion being put in the incubator at 37° C. and the other kept on the bench. In each case, only scanty Flexner bacilli survived for 24 hours in the incubated specimens, whereas over 4 days the organism persisted in apparently undiminished numbers in the specimen at room temperature. The pH of this material showed no obvious change in any specimen over 3 days.

LCC Group Laboratory, North Western Hospital, N.W.3. ROBERT CRUICKSHANK. MARJORIE GILLESPIE.

STERILISATION OF SULPHONAMIDES

SIR,—I was interested in your annotation of June 27 on the case of tetanus after local chemotherapy. For the past year the problem of sterilisation of sulphonamide compounds for local use has been under consideration by the Committee on Chemotherapeutic and Other Agents of the National Research Council. After a considerable amount of discussion, this committee decided to advise our armed forces and the Food and Drug Administration of the Federal Government that all sulphonamides which were to be used for topical application should be marketed in a sterile form. We arrived at this decision largely on a theoretical basis, because up to the present time not a single case-report has appeared which suggested that the topical use of a sulphonamide compound was responsible for an ensuing infection.

However, studies that had been made in this country showed that crystalline sulphonamides were occasionally contaminated with non-pathogenic spore-bearing and non-spore-bearing organisms. It seemed to the committee that sulphonamide compounds might, under certain conditions, become contaminated with tetanus spores, and as it was well known that these compounds had but a minor prophylactic effect on experimental tetanus infections in mice it was decided that a recommendation should be made to the proper authorities concerning the necessity of the sterilisation of the sulphonamide compounds which were to be used for topical application.

When this became known, various pharmaceutical manufacturers set to work in this country to devise methods for the proper sterilisation of crystalline sulphonamides. I am enclosing a copy of a letter from Dr. John H. Brewer of Hynson, Westcott and Dunning, in which their method of sterilisation and control of crystalline sulphanilamide is outlined. At the present time our Army and Navy are being supplied by Hynson, Westcott and Dunning with convenient 5 gramme packages of sterile sulphanilamide for topical use.

Johns Hopkins University School of Medicine. PERRIN H. LONG.

ENCLOSURE

The process we are now using for sterilisation is probably much more than is necessary, but gives us a margin of safety which is very desirable in these days of rushing things out to fill defence orders, &c. We first became interested in the sterilisation of sulphanilamide when it was found that all the powder on the market from the various manufacturers contained bacteria of various kinds. Many were contaminated with spore-forming organisms and some were found to contain very resistant spore-forming anaerobes. After these findings were made we obtained the most heat resistant spore-formers we could find—one strain of *Cl. novyi* which the suture manufacturers use as a control organism and a strain of *Cl. sporogenes* used by the canners as a control organism. Most of the information in textbooks concerning the heat resistance of spores in hot-air ovens was built up before the present accurate thermo-electric instruments were available. Since the temperature usually given for hot-air sterilisation (160° C. for one hour) is so near the melting point of sulphanilamide (163° C.) we decided to restudy the resistance of some of the spores, making use of some of the more modern instruments with extended time as is practised by some canners. It has been found that the most resistant spores of *Cl. novyi* and *Cl. sporogenes* can be killed at a temperature far below the melting point of sulphanilamide if the time element is extended sufficiently: 130° C. kills these organisms in four hours, but not in three; 140° C. kills in three hours, but not in two; 150° C. kills in two hours. Various types of forced air ovens have been tried, both electric and gas. The above temperatures will not hold for static ovens or ovens improperly baffled so that one obtains cold spots. Our present technique is as follows.

Spore controls are prepared by growing the organisms in cooked meat cultures for forty-eight hours and storing the cooked meat culture for one month in the ice-box. The spores are then added to sulphanilamide and rotated in a ball-mill to mix. One gramme of the powder contains between 10,000 and 100,000 spores. Five grammes of the powder is placed into control packages made from the same paper and prepared exactly as the finished package except it is printed in red with the words "Do Not Use Control Package" instead of the usual printing in black. These control packages are tested for their heat resistance at least once each month. So far we have found the heat resistance to remain constant. Our present hot-air oven which holds 50,000 packages each charge, so spaced in racks as to allow free circulation of the hot air, is loaded with control packages so that every cubic foot contains one control package. The oven is routinely run at 145° C. for four hours, which gives a margin of one hour and a 5° C. temperature margin. The oven is equipped with a thermocouple which can be placed directly in one of the packages and a recording thermostat for controlling the temperature and keeping a record on the run. After the oven has cooled sufficiently the dollies are removed from the oven with the racks in place and the controls are removed and sterility tested.

One fourth of each package (1·25 g. roughly) is dusted into a tube of thioglycollate medium containing 2 mg. of para-aminobenzoic acid per 100 c.cm. This makes four tubes for each control package. On each run several finished packages are also sterility tested. This work is all done in dust-free rooms to obviate contamination from the air which would hold up production. The packages are quarantined in their original position in the oven dollies until a forty-eight hour sterility packaging "OK" is given. At this time if any controls have shown growth the trays which they control are resterilised. Although we are having no difficulty now, before we got our technique working and before our oven was working properly we had many such instances. In cases where contaminated controls have been found several hundred of the

packages surrounding these controls have been tested and found to be sterile, showing that the organisms present in the sulphanilamide were not as resistant as our controls. However, at times we have isolated organisms equally resistant to *Cl. novyi* and *Cl. sporogenes* from several lots of sulphanilamide. The control tubes are incubated for seven days and a shipping "OK" is given.

Most of the other sulpha-drugs have higher melting-points and do not offer the difficulties which sulphanilamide offers.

Professor Long also enclosed examples of the packages of crystalline sulphanilamide issued to the US Army and Navy. Each holds 5 g. The Army type consists of a stout paper envelope containing an inner sterile one perforated with holes at one end for use as a shaker. The holes are covered with a loose 'Cellophane' sleeve which is removed when the sulphanilamide is to be sprinkled on a wound. The directions say, "remove the sterile shaker package with sterile forceps." The Navy type is simpler—a cellophane envelope containing a sterile paper one, to be opened by tearing off the end. The Naval directions say, "After controlling hæmorrhage, sprinkle powder in wound, covering the depth and injured surfaces lightly; then cover with sterile dressing and bandage. Warning:—This drug to be used only as directed, using not more than two packets in wounds of one person."

MELORHEOSTOSIS

SIR,—Franklin and Matheson's description of their case, to which you refer in an annotation (Aug. 22, p. 224) confirms the view that Léri and Joanny's original description of melorheostosis as *hyperostose en coulée sur toute la longeur d'un membre* can no longer be accepted as adequate. Two years ago I described (*Quart. J. Med.* 1940, **9**, 1) some unusual bony lesions affecting the right hand of a boy suffering from tuberose sclerosis. This boy died eventually from the effects of raised intracranial pressure and fortunately I was able to secure a post-mortem investigation. My inquiry, details of which I hope to publish in due course, led me to the conclusion that melorheostosis represents a local disorder of osteogenesis in which a deficiency of the periosteum is associated with a characteristic hyperostosis to which the disorder owes its name.

Birmingham, 15. GILBERT S. HALL.

DYSPEPSIA IN SOLDIERS

SIR,—The paper by Dr. Morton Gill and colleagues and the later correspondence raise many points of interest. The advantage of immediate admission of all dyspeptic soldiers and full investigation in a specialised unit must be weighed against certain drawbacks. Observation of a large number of such cases suggests that in many instances admission is directed purely towards the elimination of an inherently improbable organic disease. In such cases careful clinical diagnosis and disposal as an outpatient may be preferable, since inpatient observation, investigation and treatment are open to the risk of producing or increasing the patient's preoccupation with his digestion and so causing fixation of apprehensive attention upon his symptoms and his diet.

In soldiers it is difficult to exclude motivation of symptoms (unconscious or even conscious), and the will to recover is often less in evidence than in civilians earning their own living in a life to which they are more adapted. Such motivation probably accounts for the changes in symptoms often observed when questions of hospital admission or invaliding come to be mentioned. It is also noticeable that the relief of symptoms and response to treatment of peptic ulcer in soldiers is frequently much slower than in similar patients in peacetime, who were often relieved within a matter of a few days. This is the case even though in my experience soldiers with ulcer are as a rule of keen type, conscientious, anxious to do their bit and unwilling to blame the Army for their symptoms, which are usually of long standing. Even in these men, however, it will be important that their follow-up be observed after return to civilian life, since many show only little improvement after hospital treatment at the time of their discharge.

Among the large number of dyspeptics in whom, short of gastroscopy, no organic lesion can be found, general symptoms often outweigh and even antedate their digestive symptoms. When in such patients gastroscopic evidence of gastritis is found, it is difficult to attribute more than a part of their symptoms to this condition, especially since it is agreed that definite changes of gastritis may exist without symptoms at all. Failure of such cases to respond to treatment is suggested as a cause of their neurotic symptoms, but it seems that in some at least of these patients the organic gastric changes must be secondary to a primary neurosis, a sequence that is certainly understandable on clinical grounds. The extreme intolerance to anything but a special diet in gastritis is again regarded as indicative of a persisting gastric lesion; such dependence on a dietary regime may, however, be at least as often a mental state, and is indeed not infrequently suggested and implanted in the patient by his medical adviser. For this reason as much care is necessary in giving dietary advice to a dyspeptic as in advising restriction of exercise in cardiac cases.

Light diet and light duty are both expressions which well repay the most careful questioning, and their opposites—"heavy"—may also on inquiry offer illuminating insight into the nature of soldiers' dyspepsia. So many inconsistencies are apt to come to light that it becomes at once clear that the need for light diet or light work is psychological and not gastric; one case out of many may be given as an example of this.

A private, aged 29. Investigated and treated for 8 weeks, October–November, 1941, in special dyspepsia unit. Unit reports: "no neurotic traits. Occult blood negative. Gastroscopy, œdematous hyperæmic mucosa with multiple erosions. Treated with bed and strict dieting for 6 weeks. Repeat gastroscopy shows gastritis to have healed, but there is residual stiffening of the mucosa suggesting permanent deep changes. Recommended he be posted to a unit where he has facilities for supplementing his diet, strictly avoiding all gastric stimulants and irritants. Recommendation—this patient is likely to relapse and if this occurs he should be boarded out of the Army without further investigations."

Seen by me on July 30, 1942. Since discharge from hospital has lived on special ration allowance at his own home. States he can only eat food cooked by his wife; complains of lack of energy, breathlessness, trembling, frightened when in buses, does not like the dark, fears "make his stomach turn." Such symptoms began suddenly with diarrhœa when he had a heavy job as a messenger-boy aged 17, and he states that with their sudden onset he was afraid he would lose his job. On his mother's advice he had all his teeth out then, and has continued to treat himself with various medicines and diets ever since, without success. Carrying the post-bag used to upset his stomach and any lifting or exertion still causes stomach pain.

Can only eat toast—without the crust. Boiled eggs cause heartburn and pain, but can eat them scrambled or poached. All potatoes cause pain except when mashed with milk and butter, when he can take them safely; cannot eat cheese or vegetables; can only take a little rice and occasionally turnip if sweet. A few mouthfuls of apple make him sick, and warm tea (*not* hot) burns him inside. Food makes him breathless and if he takes a bath he has to have the door and window open or he feels faint. States all these symptoms have persisted since the onset of his stomach trouble, age 17.

It must indeed be difficult for a soldier, after some weeks of hourly feeding and prolonged hospital dieting to regain confidence in his ability to eat ordinary food, and this must be even more difficult if he is warned to be continually careful of his food and that any return of symptoms is likely to lead to invaliding!

T. C. HUNT.

LIFE CYCLE OF THE THREADWORM

SIR,—It is perhaps somewhat presumptive, after twenty years of retirement, to enter the field of controversy in regard to the life history of *Oxyuris vermicularis*, but having in the past studied and treated large numbers of cases in native children in Malaya and Borneo I beg to record my observations in the hope of assisting in the treatment of these infestations.

My conviction is that the period occupied between the ingestion of the ova and the appearance of the fully developed female worms in the rectum may be, and generally is, only a matter of two or three days and not the two weeks so persistently stated in the textbooks. I was first convinced of this from the study of a Eurasian family in Taiping, Perak, FMS, about 1912. Three of the younger children were heavily infected, and as all

of them were inveterate nail-biters there was, almost certainly, constant reinfection. Two children of relatives (a boy and a girl) came to stay with the family for a holiday and each of them shared a bed with an infected child. Neither of these children had, on arrival, any sign or symptom of infection, nor had they any previous history of having suffered from threadworms. However on the third day one of these children had intense irritation at the anus and next day both of them showed numerous female worms in the stools, which had been preserved for my inspection, while microscopically ova were numerous in the fæces.

Many will rush to their textbooks, where it is usually stated that the larvæ, after hatching, pass through two ecdyses before becoming mature, and that the duration of this cycle is two weeks. Copulation takes place in the small intestine, after which the males apparently die out. I suggest that this cycle may take place with far greater rapidity than has previously been thought possible.

As regards treatment with drugs, past experience has not been encouraging, and when prevention of reinfection is undertaken with scrupulous care drugs of any kind are, in my opinion, unnecessary. Ordinary purgation, combined with the application of an ointment of hydrarg. ammon., with the addition of 5% menthol as a parasiticide and to allay irritation, generally brings about a complete cure in about a week. 'Butolan' (Bayer), diphenan (BDH) and phenothiazine have lately been vaunted as cures, but I see already one death from the last named has been reported in the *Lancet* of July 11, 1942.

Hove. WILLIAM BRYCE ORME.

AUTUMN POLLEN FEVERS

SIR,—People over from Canada and the USA are frequently asking for, or at least about, protection from the autumn pollen-fever which produces so much distress and disability in North America. The answer is that the causal plant—ambrosia ("ragweed")—doesn't exist here; there is therefore no need for protection in the autumn.

This is not strictly true; there is a minor amount of trouble for some people from the pollen of our autumn composites, especially from the Michaelmas daisies which throng our gardens and are apt to fill our rooms at this time. But this pollen can usually be dodged, for it is not nearly so ubiquitous as the grass pollen at missummer. Also it can be protected against by precisely the same inoculation technique as that employed so successfully against true hay-fever. This is rarely necessary; I would put the ratio of the troubles from grass pollen (at midsummer) and from composite pollen (in the autumn) in the region of 100 to 5.

There is also the trouble locally from heather pollen, but this is rarer still and seems to affect chiefly the plutocratic deer-stalker in peace-time. Perhaps in war-time the soldier flat on his belly and creeping to an attack through heather may suddenly be overcome by sneezing; if thought worth while this also can be protected against prophylactically.

Indigenous inhabitants have been asking for hay-fever prophylaxis for people going overseas. It has to be explained that the timing, and even the need for protection, depends on where the man is going; it is hardly necessary outside the temperate zones where the grass grows richly, and then of course only at the local midsummer. There is little or no hay-fever in the north of Africa where our men are fighting, and not very much in other tropical or subtropical regions where, if it occurs, it depends chiefly on the local rains.

London W.1. JOHN FREEMAN.

VESTED INTERESTS

SIR,—Your correspondent W. A. G. admits that "panel" practice, where doctors have had to pay for it, constitutes a vested interest with a right of compensation to the doctors if they do not continue in such practice because of government action—i.e., it is the fact of purchase which gives the vested interest. Doctors have originated the custom of buying and selling practices, not primarily, as W. A. G. suggests, for the support of medical agencies; but agencies are frequently employed for convenience, and in order that practices may change hands in an ethical manner with due regard to the rights of both seller and purchaser. Except for those squatters who have started in practice without purchasing from another doctor, and according to W. A. G. may therefore have no claim to compensation for either private or panel, all practising doctors have purchased their panel and private work as a whole, and must surely be said to have an equal right of compensation for both parts. The panel patient is no more a chattel to be sold or transferred against his will than is the private patient.

A. J. K. D.

MASS RADIOGRAPHY IN THE FACTORY

SIR,—Dr. Stanford has done a good piece of work, and his success in persuading a number of workers to travel some distance to his X-ray apparatus is an achievement, but I feel he may be wrong about the capacity of his workpeople for understanding new ideas. The 30 women in one of his shops who declined to work there after he had explained his scheme to them had obviously misunderstood him. Their mistake may not have arisen simply because of the low "average mental level of the shop." I do not agree that the workers "hold the medical profession in profound suspicion"; they may feel like that towards their employers, but I believe their tendency is to trust the doctor, perhaps expecting rather too much of him. My own experience is that workpeople, particularly organised workpeople, quickly understand the advantages to them and the community of mass radiography, but almost as quickly perceive its implications. And I agree with them that additional beds must be allocated, allowances for dependants should be made, and some sort of provision for graded return to work is needed, preferably on the lines of the recent memo of a committee of the Tuberculosis Association.

Edgware. A. STEPHEN HALL.

Infectious Disease in England and Wales

WEEK ENDED AUG. 29

Notifications.—The following cases of infectious disease were notified during the week: smallpox, 0; scarlet fever, 1455; whooping-cough, 1212; diphtheria, 717; paratyphoid, 11; typhoid, 18; measles (excluding rubella), 3165; pneumonia (primary or influenzal), 352; puerperal pyrexia, 168; cerebrospinal fever, 66; poliomyelitis, 14; polio-encephalitis, 2; encephalitis lethargica, 3; dysentery, 91; ophthalmia neonatorum, 94. No case of cholera, plague or typhus fever was notified during the week.

The number of civilian and service sick in the Infectious Hospitals of the London County Council on Aug. 26 was 1458, including scarlet fever, 313; diphtheria, 164; measles, 234; whooping-cough, 243; enteritis, 51; chicken-pox, 76; erysipelas, 44; mumps, 53; poliomyelitis, 1; dysentery, 24; cerebrospinal fever, 8; puerperal sepsis, 29; enteric fevers, 7; german measles, 4; glandular fever, 1; malaria, 1; other diseases (non-infectious), 123; not yet diagnosed, 82.

Deaths.—In 126 great towns there were no deaths from scarlet fever, 2 (0) from enteric fevers, 2 (1) from measles, 9 (3) from whooping-cough, 16 (0) from diphtheria, 54 (4) from diarrhœa and enteritis under two years, and 11 (1) from influenza. The figures in parentheses are those for London itself.

Middlesbrough and Birmingham each reported 6 deaths from diarrhœa, Liverpool 5 and Manchester 4.

The number of stillbirths notified during the week was 207 (corresponding to a rate of 34 per thousand total births), including 15 in London.

MACHINE TOOLS OF MASS RADIOGRAPHY.—The Minister of Health has appointed a central technical committee to advise on the organisation of mass radiography. The new body will be a subcommittee of the minister's standing advisory committee on tuberculosis, and its members are: chairman, Mr. T. Lindsay (Ministry of Health); Dr. A. E. Barclay; Dr. G. Lissant Cox; Dr. James Ferguson; Surgeon-Commander W. G. C. Fitzpatrick; Dr. F. R. G. Heaf; Dr. George Jessel; Major Peter Kerley; Brigadier D. B. McGrigor; Dr. S. Cochrane Shanks; Dr. Norman Smith; Wing-Commander R. R. Trail; and Dr. Harley Williams (secretary), with representatives of the Ministry of Labour and the Department of Health for Scotland. The first sets of apparatus are expected to be available before the end of the year, and the remainder of the 25 already ordered will be in use during 1943. The committee intends to provide a scheme for the employment of these units throughout the country, including adequate technical standards. It has already considered the training of personnel and the allocation of the first sets.

Obituary

GERARD JOSEPH HANLY

MB NUI, FRCS, FRCSE

ACTING GROUP-CAPTAIN, RAF

Group-Captain Gerard Hanly, who died on active service on Aug. 6 as the result of a flying accident, qualified at the National University of Ireland in 1923, and was appointed to a commission in the medical branch of the Royal Air Force a year later. During 1925–29 he served in India, and on his return to this country at RAF hospitals at Halton and Cranwell. He took the FRCSE and qualified as a pilot before he was posted in 1933 to Iraq for surgical duties. He returned in 1936, and continued to fill specialist posts until again posted to Iraq in 1941 to command the hospital at Habbaniya.

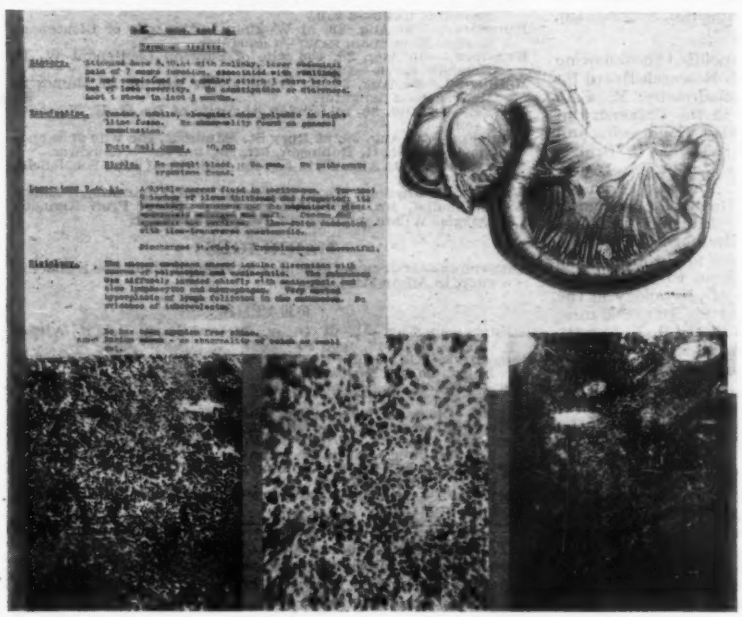
Hanly was an able surgeon and an efficient and zealous officer, popular with his colleagues and his staff. His interest in flying, combined with his professional qualifications, made him particularly suited to the care of RAF personnel, and gave him an insight into the problems peculiar to the Service which lent weight to his advice.

Surgeon Commander JAMES MICHAEL MCNAMARA, RN, who died from wounds last April, qualified MB from the National University of Ireland in 1923. He entered the Navy at the end of 1928 as a surgeon lieutenant for short service and transferred to the permanent list in 1932. Two years later he was promoted surgeon lieut.-commander and he received his final rank in 1940 while serving on HMS *Hermes*. He was forty years of age.

Notes and News

PATHOLOGY IN PAINT

HOSPITAL museums generally contain a few pots which provoke nothing but ribald guess-work and a good many more which give a thoroughly false impression of the lesion they are supposed to illustrate. Nowadays it is increasingly difficult to get mounting and preserving materials for either operative or post-mortem specimens and the maintenance of natural colours is thus a temporarily lost art. This has led the Middlesex county council to appoint Miss D. H. Barber, who had already made drawings for the clinical staff, as medical artist to the Central Middlesex County Hospital. With the help of her careful and accurately coloured drawings, teaching cards like the one reproduced here can be made up. A picture of the specimen in full colour is seen alongside microphotographs of its sections and a typewritten account of the case. She is also able to make drawings of gastroscopic findings and extensive neuro-surgical operations which could not otherwise be reproduced. These illustrations will be a valuable addition to the museum, and may in turn be accepted not merely as a substitute for other teaching material but as an advance.



EYE INJURIES IN COALMINES

ULCER of the cornea is common in the eye wards of the Edinburgh Royal Infirmary, and in a series of 350 ulcers 66·8% occurred in coalminers. The condition is serious and the results of hospital treatment are poor. Often no useful vision is left in the affected eye. The average stay in hospital is about three weeks. After two years' research work for the Ross Foundation for the Study of Prevention of Blindness in the pharmacology department of Edinburgh University it was discovered that 'Albucid soluble' is more effective in preventing infection of the cornea than any treatment previously used. As the preparation is harmless to the eye it was felt that it could be confidently recommended as a useful first-aid treatment in ambulance rooms at collieries. Thirty collieries in Scotland were selected for a trial of the new treatment and after six months the results have been summarised thus in a report issued by the foundation:

Total number of men employed at the collieries	23,500
Number of injuries treated with albucid soluble	646
Foreign bodies removed from the eye with brush	360

Of all cases treated at the ambulance room fifteen men lost 74 days' work, an average loss of 5 days. Only seven cases were admitted to hospital with corneal ulcer during the six months and three of these had not had albucid treatment. The length of stay in hospital varied from 19 days to 3½ months. The success of albucid soluble in preventing infection and ulcer of the cornea has therefore been outstanding and the new treatment is greatly appreciated by workmen who regard it as a great improvement on the old. The report has been brought to the notice of the Mines Department and the Factory Department of the Ministry of Labour and is obviously of wide general interest.

THRASHING IT OUT

SINCE free speech is our birthright it is high time we learned to speak freely: that seems to be the feeling which has moved the Association for Education in Citizenship to sponsor a series of handbooks for discussion groups under the ominous but stimulating title—taken from Mr. Roosevelt—of *Unless We Plan Now*.[1] The first four of the series are now available. In the first Eva Hubback gives a thoroughly practical account of how to lead discussion groups, with suggestions for reading on modern political ideas, on governmental, social and economic problems at home, in the Empire and abroad, international affairs, and psychology and clear thinking. In the second handbook Francis Williams discusses the democratic idea. Frank Hardie asks, in the third, "is Britain a democracy?" He gives a concise picture of our electoral system and the structure of government. The fourth, by Elizabeth E. Halton, sets out some of the principles of planned housing under the title *Our Towns*. The writers offer suggestions for reading, subjects for discussion, or lists of films and exhibitions bearing on their subjects. Other handbooks in this series are to be on

1. Published for the Association by the English Universities Press Ltd., St. Hugh's School, Bickley, Kent. 3*d*. each.

economic reconstruction, health, school education and schools, population and the cinema. The association hopes in this way to encourage organised discussion of social, economic and political problems arising out of the war in such bodies as debating societies and discussion circles formed in the Forces, among civil defence workers, and in youth groups, church groups and women's societies.

Nothing clears up the opinions of a woolly thinker so well as the discipline of making a speech about them; a clear thinker profits by what Prof. R. S. Aitken has called the cross-fertilisation of other minds. These handbooks carry the germ of plenty of lively thinking.

University of Manchester

The degree of DSc in physiology has been conferred on Squadron-Leader Denis Williams, MD.

University of Durham

Dr. J. C. Spence has been appointed to a chair in child health at King's College, Newcastle-on-Tyne, which the university has created with the help of the Nuffield Trust.

Dr. Spence, who is 50 years of age, graduated with honours in medicine from the University of Durham in 1914. During that war he served with the 11th division in Gallipoli, Egypt and France. After holding resident appointments at the Royal Victoria Infirmary and at Great Ormond Street he worked with the John and Temple research fellowship at St. Thomas's Hospital, and later at the Johns Hopkins Hospital with a Rockefeller fellowship. He returned to this country and to Newcastle, where he was clinical pathologist to the Royal Victoria Infirmary before being appointed to its staff and to the staffs of the Babies Hospital and the General Hospital. He also became lecturer on diseases of children in the University of Durham. He was one of the foundation members of the British Pædiatric Association and has been a keen critic of the education of medical students in child health. Dr. Spence took his MD in 1921, was elected FRCP in 1930, and his Bradshaw lectures to the Royal College of Physicians on the nature of disease in infancy were published in our columns (*Lancet*, 1941, i, 777).

Society of Apothecaries of London

At a court of assistants held on Aug. 18, with Sir Stanley Woodwark, the master, presiding, it was resolved to revive the premedical examination in chemistry, physics and biology.

The diploma of the society was granted to C. A. Anderson, R. Powell, R. Gunewardena, T. W. Renton, G. Jarratt, P. L. McN. Armstrong, A. G. S. Bailey and F. A. Rutland.

British Orthopædic Association

The annual general meeting of this society will be held at Nottingham on Sept. 25 and 26 under the presidency of Mr. G. R. Girdlestone. On the morning of the 25th a clinical meeting will be held at the Harlow Wood Orthopædic Hospital; in the afternoon there will be a discussion on rehabilitation followed by a demonstration, at the Rehabilitation Centre for Miners, Berry Hill, near Mansfield. On the 26th the meeting will be continued at the General Hospital, Nottingham.

Industrial Health Research Board

The Medical Research Council have appointed the following to be members of their Industrial Health Research Board for the next three years: Lord De La Warr (chairman); Mr. F. C. Bartlett, FRS, professor of psychology in the University of Cambridge; Brigadier-General A. C. Baylay, Engineering and Allied Employers National Federation; Dr. J. C. Bridge, senior medical inspector of factories; Dr. A. N. Drury, FRS, Medical Research Council; Dr. Thomas Ferguson, deputy chief MO of the Department of Health for Scotland; Dr. M. W. Goldblatt, group MO of Imperial Chemical Industries at Manchester; Mr. A. Bradford Hill, DSc, reader in epidemiology and vital statistics in the University of London; Dr. Donald Hunter, physician to the London Hospital; Dr. Esther Killick, professor of physiology in the University of London; Air Vice-Marshal Sir David Munro, chief MO at the Ministry of Supply; and Mr. J. L. Smyth, general secretary of the Transport and General Workers' Union. Prof. A. W. M. Ellis, FRCP, director of research in industrial medicine under the council, will also attend all meetings. Dr. R. S. F. Schilling, one of H.M. medical inspectors of factories, has been seconded to the service of the council by the Ministry of Labour to act as secretary of the board. The terms of reference of the board have recently been revised and are now as follows: "To advise and assist the Medical Research Council in promoting scientific investigations into problems of health among workers, including occupational and environmental factors in the causation of ill health and disease, and the relation of methods and conditions of work to the functions and efficiency of body and mind; and in making known such results of these researches as are capable of useful application to practical needs."

Paddington Medical Society

This society will hold an informal reception at St. Mary's Hospital, Paddington, on Sunday, Sept. 20, at 2.30 PM, where members will meet medical men and women from America, the Dominions and India who are in this country on war service.

Socialist Medical Association

On Wednesday, Sept. 16, at 5.30 PM, Prof. M. Greenwood, FRS, will speak to this society on epidemiology and war. On Wednesday, Oct. 7, at 5.30 PM, Prof. J. A. Ryle will discuss social medicine. Both meetings will be held at the Conway Hall, Red Lion Square, London, WC1.

Medical Casualties

The following RAMC officers have been posted as prisoners of war: WS/Captain A. M. Boyd, MB Belf; Captain E. T. Gilbert, MB Belf; Captain W. O. James, MB Edin; WS/-Captain A. MacFarlane, MB; Major J. Parkes, MRCP; WS/Captain E. T. M. Smith, MB Birm; and T/Major A. McL. W. Thomson, FRFPS.

Survey of Scottish Hospitals

The Secretary of State for Scotland has appointed Prof. J. M. Mackintosh, Prof. C. F. W. Illingworth and Dr. R. J. Peters to investigate the accommodation, organisation, equipment, staffing, number and origin of patients treated in the general and special departments of West of Scotland hospitals. The survey, which may develop into a census of all Scottish hospitals, will be complementary to the work of the Hetherington Committee now inquiring into questions of principle likely to be involved in a large-scale hospital reorganisation.

STUDENTS GUIDE: CORRIGENDUM.—The regulations about submitting case-records and commentaries to the Royal College of Obstetricians and Gynæcologists apply to candidates for the Membership examination, not to those entering for the DRCOG as stated in our issue of Aug. 29, p. 247.

Appointments

WILSON, JOHN, MB: RSO at the Montagu Hospital, Mexborough.

THISTLEWAITE, ELEANOR C., MB ST AND: temp. asst MOH for Portsmouth.

Births, Marriages and Deaths

BIRTHS

BRODRIBB.—On Sept. 2, at Buxton, the wife of Captain H. S. Brodribb, RAMC—a son.

HOUSEMAN.—On Aug. 29, at Woking, to the wife of Lieutenant Gordon Houseman, RAMC—a daughter.

KERSHAW.—On Aug. 28, the wife of Surgeon Lieutenant W. E. Kershaw, RNVR—a son.

MCGREGOR.—On Aug. 26, at Croydon, the wife of Dr. James S. McGregor—a daughter.

NEWNS.—On Aug. 30, in London, the wife of Dr. G. H. Newns—a son.

ROBINSON.—On Aug. 30, at Bury St. Edmunds, the wife of Squadron-Leader R. G. Robinson, GM, MB, RAFVR—a daughter.

SCHOLEFIELD.—On Aug. 26, in London, the wife of John Scholefield, FRCS—a son.

WILKINSON.—On Sept. 7th, at Harborne Road, Edgbaston, to Agnes Hallimond, MB, MRCP (née Crozier), wife of Prof. Kenneth Douglas Wilkinson, OBE, MD, FRCP—a daughter.

MARRIAGES

ARMSTRONG—AUSTEN.—On Sept. 4, in London, Richard Armstrong, FRCP, to Alison Mary Austen.

DEATHS

GIBSON.—On Aug. 31, at Orton, Westmorland, Robert Wilson Gibson, MD EDIN, aged 80 years.

JOHNSTONE.—On Sept. 1, at Preston, Lancs, George Gordon Johnstone, MC, MD CAMB, DPH.

LOW.—On Sept. 2, Vincent Warren Low, CB, MD LOND, FRCS, of Harley Street, W1.

MEYER.—On Aug. 30, at Exeter, Charles Hartwig Louw Meyer, MD LOND, lieut.-colonel IMS retd., aged 82 years.

NEFF.—On Aug. 28, at Nicosia, Eroll Aubrey Neff, CMG, MCPS Alberta, director of medical services, Cyprus.

WATERSTON.—On Sept. 4, in Edinburgh, David Waterston, MD EDIN, FRCSE, FRSE, aged 71.

WOODROFFE.—On Sept. 3, in Bournemouth, Harry Dobrée Woodroffe, MD DUBL.

The fact that goods made of raw materials in short supply owing to war conditions are advertised in this paper should not be taken as an indication that they are necessarily available for export.

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McVITIE & PRICE'S
DIGESTIVE BISCUITS
MADE FROM DAIRY-FRESH BUTTER AND WHOLESOME BRITISH WHEAT

THE IMPORTANCE OF AN INFANT'S FIRST SOLID FOOD

A progressive step by an old-established firm

READY-STRAINED VEGETABLES IN GLASS BOTTLES

VACUUM STEAM-COOKED

THESE ready-strained vegetables — prepared by the old-established firm of Brand & Co. Ltd., makers of Brand's Essence—will be welcomed by young mothers who have for some time realized that finely sieved vegetables are an ideal way of starting infants on more solid foodstuffs.

Specially grown vegetables are used for Brand's Baby Foods. These are picked at their prime; steam-cooked *in vacuum*—and packed in vacuum, too. The vegetables are then forced through a fine-mesh sieve which breaks up the solid particles completely and gives an absolutely smooth, even texture. Modern scientific methods are thus able to ensure the preservation of the valuable mineral salts and vitamins, also the fresh natural colour and flavour of the vegetables, far better than home-cooking can.

Most doctors recommend starting the change-over to a more solid diet with Brand's Bone-and-Vegetable Broth—it can be added to the milk feed at first. Strained Carrot can be given at four months; Strained Prunes and Strained Beetroot after six months.

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Prepared by the makers of Brand's Essence

7½d. a jar

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OESTRIN	Indications: Menopause; Menstrual irregularities; Uterine Inertia; Amenorrhœa; Pruritus Vulvæ; Suppression of Lactation. *Tablets:* 1000 *I.U.* *Ampoules:* 1000-50000 *I.B.U.*
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"PITOXYLIN" (PITUITARY EXTRACT—POSTERIOR LOBE)	Licensed and standardised in accordance with the Therapeutic Substances Act. For the Induction of Labour; Uterine Inertia, Post Partum Hæmorrhage; Surgical Shock; Diabetes Insipidus. *Ampoules: 5, 10 and 20 I.U*
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there is a very wide range of types from non-electrical to the very latest midget-valve types to ensure suitable fitting after Aurameter Test and an organisation which, in spite of the war, is still able to offer an adequate after-fitting service in all parts of the country

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SINGLE VACCINATION TUBES - - - 10d. each; 9s. dozen. Postage extra.
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BRITISH POSTGRADUATE MEDICAL SCHOOL
(UNIVERSITY OF LONDON)

WAR SURGERY OF THE EXTREMITIES
21st to 25th September, 1942

Monday, 21st Sept.	10 A.M.	Administrative Problems in War Surgery.	Major-Gen. Mitchiner, C.B.E., T.D., F.R.C.S.
	11.15 A.M.	General Principles of War Surgery of the Limb.	Prof. G. Grey Turner, F.R.C.S.
	2 P.M.	Traumatic Arterial Spasm	Mr. Sol M. Cohen, M.S., M.B., F.R.C.S.
	3.15 P.M.	Pathological Features of War Wounds.	Major R. Raven, F.R.C.S.
Tuesday, 22nd Sept.	10 A.M.	Wounds of the Extremities with or without Fractures.	Lt.-Col. A. W. M. White, R.C.A.M.C.
	1.30 P.M.	Radiological Investigation of Wounds of the Extremities.	Major J. Duncan White, M.B., Ch.B., D.M.R.E.
	2.30 P.M.	Shock	Dr. J. McMichael, M.D., F.R.C.P., F.R.S.E.
Wednesday, 23rd Sept.	10 A.M.	War Burns	Mr. E. E. Lewis, F.R.C.S.
	11.15 A.M.	Wounds of Joints	Mr. Z. Cope, M.S., F.R.C.S.
	1.45 P.M.	Amputations	Mr. Jenner Verrall, F.R.C.S.
	2.45 P.M.	Primary Care of Nerve Injuries.	Professor Seddon, F.R.C.S.
Thursday, 24th Sept.	10 A.M.	Infections	Prof. J. Paterson Ross, F.R.C.S.
	11.15 A.M.	Blood Transfusion	Dr. Janet Vaughan, D.M., F.R.C.P.
	1.30 P.M.	Tetanus	Dr. Leslie Cole, M.D., F.R.C.P.
	2.30 P.M.	Demonstration of Plaster Technique.	Mr. G. C. Dorling, F.R.C.S.
Friday, 25th Sept.	10 A.M.	Secondary Hæmorrhage ..	Surgeon Rear-Admiral Gordon-Taylor, O.B.E., M.S., F.R.C.S.
	11.15 A.M.	Traumatic Aneurysm ..	Surgeon Rear-Admiral Gordon-Taylor, O.B.E., M.S., F.R.C.S.
	2 P.M.	Injuries of Hands and Feet	Major Duncan Croll, M.D., C.M. (McGill), F.A.C.S., R.C.A.M.C.
	3 P.M.	Gas Gangrene and other Anaerobic Infections.	Mr. G. T. Mullally, M.C., M.S., F.R.C.S.

The fee for the Course will be one guinea, but no fee will be charged in the case of Officers of the Armed Forces who are nominated for the course by their respective Director-Generals. Applications for admission should be addressed to the DEAN, British Postgraduate Medical School, Ducane-road, W.12.

Further War Courses will commence as follows:—

SURGICAL CARE OF THE SOLDIER IN TRAINING	MONDAY, 5TH OCTOBER.
WAR SURGERY OF THE ABDOMEN ..	MONDAY, 19TH OCTOBER.
WAR MEDICINE COURSE	MONDAY, 2ND NOVEMBER.

STAMMERING
SPEECH DEFECTS
RESIDENT AND NON-RESIDENT PUPILS.

Full Particulars upon request to:

Mr. A. C. SCHNELLE,
119, Bedford Court Mansions, London, W.C.1

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L. M. S. S. A.

FINAL EXAMINATION: SURGERY, October 12th, November 9th, December 7th, 1942; MEDICINE, October 19th, November 16th, December 14th, 1942; MIDWIFERY, October 20th, November 17th, December 15th, 1942.

For regulations apply REGISTRAR, Apothecaries' Hall, Black Friars-lane, London, E.C.4.

University of Edinburgh.

DIPLOMA IN PUBLIC HEALTH.

Notice is hereby given that, at the desire of the Secretary of State for Scotland, on the recommendation of the Central Medical War Committee, the University of Edinburgh has decided to discontinue the Course for the Diploma in Public Health for the duration of the war.

W. A. FLEMING, Secretary to the University.

Fripp Fellowship in Child Psychology at GUY'S HOSPITAL, open to medical graduates, Men or Women (unmarried), preferably with experience in pediatrics as well as in psychological medicine. Stipend £300 a year, and allowance for books and instruments. The appointment is for two years and may be held concurrently with a part-time appointment elsewhere.

Applications should be made to the DEAN, Guy's Hospital Medical School, London Bridge, S.E.1, on or before Saturday, 19th September.

ROYAL EARLSWOOD INSTITUTION
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For MENTAL DEFECTIVES of all ages

Training under medical supervision. Schools, Farm, Trade Workshops, Recreations. Fees £125 to £375 p.a. Election by votes of subscribers at reduced terms for necessitous trainable cases.

Apply, Secretary. Tel.: Redhill 344.

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For Mental Cases with or without Certificates.

Ordinary Terms: Five Guineas per week (including Separate Bedrooms for all suitable cases without extra charge).

For forms of admission, &c., apply to the Resident Physician, CEDRIC W. BOWER.

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For LADIES and GENTLEMEN of Unsound Mind.

Terms moderate. Apply to Resident Medical Superintendent. Telegrams: ADAM WEST MALLING. Telephone No. 2: MALLING.

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Open Air Occupation and Recreation for Patients, Farming, Gardening, Football, Cricket, Tennis, Bowls, etc. School recognised by Board of Education.

FEES—1st Class (men only)	from £3 per week
2nd Class (men and women)	,, 37/6 ,,
3rd Class (men and women) supported by—	
Public Assistance Committees ..	,, 27/6 ,,
Education Committees	,, 33/6 ,,
Private	,, 21/- ,,

For further particulars apply to—
C. EDGAR GRISEWOOD, A.C.A., 30, Exchange Street East, LIVERPOOL 2

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A Private Home for the Care and Treatment of a limited number of LADIES with Mental and Nervous Disorders. Certified, Voluntary, and Temporary Patients received. Mansion with 12 acres of ground. (See *Medical Directory*, p. 2362.) Apply Resident Physician. Telephone: Little Chalfont 2046. Station: Chalfont and Latimer.

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PRIVATE MENTAL HOME for Nervous and Mental Illness. All forms of treatment available. Fees from 4 gns. per week upwards according to requirements. Vacancies occasionally exist at reduced fees on the recommendation of the patient's own physician.

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Telephone: WELbeck 2728 Telegrams: "ASSISTIAMO, LONDON"

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MENTAL NURSES

Male or Female

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In conjunction with the MALE NURSES' ASSN.

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Mrs. MILLICENT HICKS, *Superintendent* W. J. HICKS, *Secretary*

ST. ANDREW'S HOSPITAL

FOR NERVOUS AND MENTAL DISORDERS

NORTHAMPTON

FOR THE UPPER AND MIDDLE CLASSES ONLY.

PRESIDENT: THE MOST HON. THE MARQUESS OF EXETER, K.G., C.M.G., A.D.C.

MEDICAL SUPERINTENDENT: THOMAS TENNENT, M.D., F.R.C.P., D.P.H., D.P.M.

This Registered Hospital is situated in 130 acres of park and pleasure grounds. Voluntary patients, who are suffering from incipient mental disorders or who wish to prevent recurrent attacks of mental trouble; temporary patients, and certified patients of both sexes are received for treatment. Careful clinical, bio-chemical, bacteriological, and pathological examinations. Private rooms with special nurses, male or female, in the Hospital or in one of the numerous villas in the grounds of the various branches can be provided.

WANTAGE HOUSE

This is a Reception Hospital in detached grounds with a separate entrance, to which patients can be admitted. It is equipped with all the apparatus for the complete investigation and treatment of Mental and Nervous Disorders by the most modern methods: insulin treatment is available for suitable cases. It contains special departments for hydrotherapy by various methods, including Turkish and Russian baths, the prolonged immersion bath, Vichy Douche, Scotch Douche, Electrical baths, Plombieres treatment, etc. There is an Operating Theatre, a Dental Surgery, an X-Ray Room, an Ultra-violet Apparatus, and a Department for Diathermy and High-frequency treatment. It also contains Laboratories for bio-chemical, bacteriological, and pathological research. Psychotherapeutic treatment is employed when indicated.

MOULTON PARK

Two miles from the Main Hospital there are several branch establishments and villas situated in a park and farm of 650 acres. Milk, meat, fruit, and vegetables are supplied to the Hospital from the farm, gardens, and orchards of Moulton Park. Occupational therapy is a feature of this branch, and patients are given every facility for occupying themselves in farming, gardening, and fruit growing.

BRYN-Y-NEUADD HALL

The seaside house of St. Andrew's Hospital is beautifully situated in a Park of 330 acres, at Llanfairfechan, amidst the finest scenery in North Wales. On the North-West side of the Estate a mile of sea coast forms the boundary. Patients may visit this branch for a short seaside change or for longer periods. The Hospital has its own private bathing house on the seashore. There is trout-fishing in the park.

At all the branches of the Hospital there are cricket grounds, football and hockey grounds, lawn tennis courts (grass and hard courts), croquet grounds, golf courses, and bowling greens. Ladies and gentlemen have their own gardens, and facilities are provided for handicrafts, such as carpentry, etc.

For terms and further particulars apply to the Medical Superintendent (TELEPHONE: No. 2356 and 2357 Northampton), who can be seen in London by appointment.

CAMBERWELL HOUSE, 33, Peckham Road, London, S.E.5

Telegrams: "PSYCHOLIA, LONDON"

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Telephone: RODNEY 4242 (2 lines)

Completely detached Villas for mild cases. Voluntary Patients received. Twenty acres of grounds; own garden produce. Hard and grass tennis courts, putting greens, Recreation Hall with Badminton Court, and all indoor amusements. Occupational therapy, Calisthenics, Actino-therapy, prolonged immersion baths, shock and also modified insulin treatment. Chapel.

Senior Physician, Dr. HUBERT JAMES NORMAN, assisted by a resident Medical Staff and visiting Consultants

An Illustrated Prospectus giving fees, which are strictly moderate, may be obtained upon application to the Secretary

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FOR THE TREATMENT OF EIGHT LADIES, VOLUNTARY, TEMPORARY AND CERTIFIED PATIENTS

CLIFFDEN, TEIGNMOUTH

FOR EARLY AND CONVALESCENT CASES Recreational Therapies are held daily by skilled Leaders

The house stands high with spacious balconies and extensive views of the South Devon Coast. Beautiful garden. Own Dairy in 25 acres. Private road to beach. There is also a charming house, EBWORTHY, MANATON, DARTMOOR, situated in 20 acres, 1100 ft. up for bracing moorland air

Resident Physicians—BERTHA M. MULES, M.D., B.S. ANNE S. MULES, M.R.C.S., L.R.C.P. *Telephones*—STARCROSS 259 and TEIGNMOUTH 289

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A Private Hospital, exclusively for the treatment of POST-ENCEPHALITIC PARKINSONISM, PARKINSON'S DISEASE and ALLIED DISORDERS

The Nursing Home is governed by Trustees; any surplus is utilized to help patients who cannot afford full fees. Extensive grounds. Hydro. Expert Massage and Physical re-education. Dietary treatment. Equipped with every laboratory apparatus for the investigation and treatment of the diseases. Results of the BULGARIAN TREATMENT published (*Lancet*, 1939, I, 693) approx.: 300 patients treated in the last 3 years. Terms moderate. Further particulars apply Medical Superintendent. Tel.: Rochdale 2960.

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For the reception and treatment of PRIVATE PATIENTS of both sexes of the UPPER AND MIDDLE CLASSES suffering from Mental and Nervous Disorders, Alcoholism and Drug Addiction, either voluntarily, temporarily, or under certificate. Patients are classified in separate buildings according to their mental condition. Situated in park and grounds of 400 acres. Self-supported by its own farm and gardens in which patients are encouraged to occupy themselves. Every facility for indoor and outdoor recreation. For terms, prospectus, etc., apply MEDICAL SUPERINTENDENT. *Telephone:* Ashton-in-Makerfield 7311. *Telegraphic Address:* Wootton, Ashton-in-Makerfield.

CHEADLE ROYAL

CHEADLE CHESHIRE

A Registered Hospital for MENTAL DISEASES, and its Seaside Branch, GLAN-Y-DON, Colwyn Bay, N. Wales

THE object of this Hospital is to provide the most efficient means for the treatment and care of those of the Upper and Middle Classes suffering from MENTAL and NERVOUS DISEASES. The Hospital is governed by a Committee appointed by the Trustees of the Manchester Royal Infirmary. VOLUNTARY, TEMPORARY, AND CERTIFIED PATIENTS RECEIVED

For Terms and further information apply to the MEDICAL SUPERINTENDENT *Telephone*: GATLEY 2231

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On the Cotswold Hills seven miles from Cheltenham, Stroud and Gloucester. Fully equipped for the treatment of all forms of Tuberculosis. **Terms: 5½ to 9½ guineas per week, inclusive.** Full particulars from MEDICAL SUPERINTENDENT, Cotswold Sanatorium, Cranham, Gloucester. *Telephone:* Witcombe 81. *Telegrams:* "Hoffman, Birdlip."

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This Sanatorium is established for the treatment of Tuberculosis of the Lungs and the Pleural Cavities. It is situated in the midst of a large area of park-land at a height of 450 feet above sea-level. Average rainfall 29·57 per annum. Full day and night Nursing Staffs. X-ray plant. Every facility for Artificial Pneumothorax and for operations on the Chest. Electric Lighting. Central Heating.

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Specially built and licensed for the care and treatment of a limited number of Ladies and Gentlemen suffering from NERVOUS and MENTAL breakdown. Voluntary and certified patients received. Ladies also admitted as Temporary Patients without certification. Terms moderate. *Apply*, RESIDENT PHYSICIAN, who may be seen in Liverpool, by appointment. *Tel. No. 8 Formby.*

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REGISTERED HOSPITAL for Voluntary, Temporary, or Certified PRIVATE PATIENTS of UPPER and MIDDLE CLASSES. Own kitchen garden. Modern forms of treatment, including Electro-shock Therapy. Out-door games, cinema visits, motor drives arranged. Visiting Chaplain.

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TEMPORARY ASSISTANT MEDICAL OFFICERS, Class I (B1). Salary £350–£25–£425.

ST. PANCRAS HOSPITAL, 4, St. Pancras-way, N.W.1.	Surgical duties.
HIGHGATE HOSPITAL, Dartmouth Park Hill, N.19.	Medical duties.
ST. MARY ABBOTS HOSPITAL, Marloes-road, Kensington, W.8.	Medical duties.
COLINDALE HOSPITAL, The Hyde, N.W.9.	Experience and treatment of tuberculosis required.
*ST. BENEDICT'S HOSPITAL, Church-lane, Tooting, S.W.17.	General medical duties.

* Women applicants only; additional allowance of £50 a year as Deputy Medical Superintendent.

R practitioners holding A or B2 posts and rejected by the R.A.M.C. may also apply.

TEMPORARY ASSISTANT MEDICAL OFFICERS, Class II (B2). Salary £250.

DULWICH HOSPITAL, East Dulwich-grove, S.E.22.	General medical duties.
ST. ALFEGE'S HOSPITAL, Vanbrugh Hill, S.E.10.	Medical duties with obstetrics.
†Various Hospitals for Infectious Diseases.	

R practitioners qualified more than three months cannot be considered unless they have been rejected by the R.A.M.C. If held by a practitioner (Male or Female) liable under the National Service Acts, 1939–41, the appointment will be limited to six months.

† Officers are eligible for promotion to Class I (B1) (temporary), after a minimum period of six months' service.

All the above positions are with board, lodging, and washing.

Application forms obtainable (stamped foolscap envelope necessary) from the MEDICAL OFFICER OF HEALTH (S.D.2), County Hall, S.E.1, returnable by 21st September. Canvassing disqualifies.

Royal Free Hospital,

Gray's Inn-road, W.C.1.

Applications are invited from registered medical practitioners for the appointment of RESIDENT ASSISTANT MEDICAL REGISTRAR (B1). The duties will comprise mainly those of Casualty Officer. R practitioners holding A or B2 posts and rejected by the R.A.M.C. may also apply. Salary £350 per annum, payable by the Ministry of Health.

Applications, stating age and accompanied by copies of three recent testimonials, should be sent to the undersigned (from whom all information may be obtained) on or before 19th September, 1942. RICHARD T. BARTLEY, Secretary.

Bolingbroke Hospital,

Wandsworth Common, S.W.11.

Applications are invited from registered medical practitioners (Male) for the appointment of a HOUSE SURGEON (A), vacant on the 1st October. Salary is at the rate of £120 per annum, with full residential emoluments. The appointment is for six months. Practitioners within three months of qualification and liable under the National Service Acts, 1939–41, may also apply.

Applications, stating age, nationality, qualifications, and experience, accompanied by copies of three recent testimonials, should be sent immediately to—

W. S. RANDOLPH BISS, Secretary-Superintendent.

Queen Mary's Hospital for the

EAST END, Stratford, E.15.

Applications are invited for the post of SURGEON in charge of the EAR, NOSE, AND THROAT DEPARTMENT of the above Hospital. Candidates must be Fellows of a Royal College of Surgeons engaged in consulting practice as an Aural Specialist. The appointment in the first instance will be for the duration of the war.

Applications to be sent not later than Tuesday, the 15th of September, 1942, to: BERNARD T. HEMPEL, Captain, Chairman.

Examining Surgeons:

FACTORIES ACT, 1937.

The following appointments as Examining Surgeon under the Factories Act, 1937, are vacant.

Applications should be sent to the CHIEF INSPECTOR OF FACTORIES, 28, Broadway, Westminster, London, S.W.1.

District	*County*	*Latest date for receipt of application*
ATTLEBOROUGH ..	NORFOLK ..	22nd September, 1942.
CAMPBELTOWN ..	ARGYLL ..	22nd September, 1942

Royal Free Hospital,

Gray's Inn-road, London, W.C.1.

Applications are invited for the post of HONORARY NEURO-SURGEON to the Hospital for the duration of the war. Candidates are expected to submit such evidence of their qualifications as they may think desirable. The successful candidate will be required to undertake not to practise other than Neuro-surgery both in Hospital and in private practice.

Applications to be sent in not later than 10th October.

RICHARD T. BARTLEY, Secretary.

Hampstead General Hospital, N.W.3.

Applications are invited from single medical Men or Women for the post of RESIDENT HOUSE SURGEON (B2), tenable for six months. Practitioners qualified more than three months and liable under the National Service Acts, 1939–41 (males must be rejected by the R.A.M.C.), may also apply. Salary £133 6s. 8d. per annum.

Applications on the prescribed form, with copies of three testimonials, to be returned not later than 24th September.

KENNETH A. F. MILES, House Governor.

Royal National Orthopædic Hospital,

BROCKLEY HILL, STANMORE, MIDDLESEX.

Applications are invited from registered medical practitioners for the appointment of RESIDENT HOUSE SURGEON (B2), Male or Female, to commence 1st October. Salary £200 per annum, with board, quarters, laundry, &c. Practitioners qualified more than three months and liable under the National Service Acts, 1939–41 (males must be rejected by the R.A.M.C.), may also apply when appointment will be limited to six months.

Applications should be addressed to the SECRETARY, 234, Great Portland-street, W.1, not later than 22nd September.

Nottingham and Midland Eye Infirmary.

Applications are invited from registered medical practitioners, Male and Female, for the appointment of a HOUSE SURGEON (B1). Applicants should have had some surgical ophthalmic experience. R practitioners holding A or B2 posts and rejected by the R.A.M.C. may apply. Salary according to experience, minimum £200, with full residential emoluments.

Applications, stating age, nationality, qualifications, and experience, with copies of three recent testimonials, immediately to: T. RUSSELL MOORE, Secretary.

The Ropewalk, Nottingham.

Lord Mayor Treloar Cripples'

HOSPITAL, ALTON, HANTS. (400 Beds.)

Required on 1st October for the post of THIRD RESIDENT MEDICAL OFFICER (A) (Male and unmarried). Salary at the rate of £200 per annum with usual emoluments. Practitioners within three months of qualification and liable under the National Service Acts, 1939–41, may also apply when appointment will be for six months.

Apply, with copies of three testimonials, to the MEDICAL SUPERINTENDENT at the Hospital.

The Prince of Wales's Hospital, PLYMOUTH.

Applications are invited from registered medical practitioners, Male and Female, for the following appointments:—

SENIOR HOUSE SURGEON (B2), for duty at the DEVONPORT SECTION, vacant on 8th October. The salary is at the rate of £150 per annum, with full residential emoluments. Practitioners qualified more than three months and liable under the National Service Acts, 1939–41 (males must be rejected by the R.A.M.C.), may also apply when appointment will be limited to six months.

HOUSE PHYSICIAN (A), for duty at the GREENBANK-ROAD SECTION, vacant on 14th November. Salary is at the rate of £132 per annum, with full residential emoluments. Practitioners within three months of qualification and liable under the National Service Acts, 1939–41, may also apply when appointment will be for six months.

Applications, stating age, nationality, qualifications, and accompanied by copies of testimonials, to—

ARTHUR R. CASH, General Superintendent.

Head Office, Greenbank-road, Plymouth,
3rd September, 1942.

County of Warwick.

NUNEATON EMERGENCY HOSPITAL.

Applications are invited from registered medical practitioners for the appointment of TEMPORARY MEDICAL SUPERINTENDENT (B1) at the above Hospital which is included in the Emergency Hospital Scheme. The person appointed will be required to devote his whole time to the duties of the office. The appointment is temporary in character during the absence of the permanent officer with His Majesty's Forces. The salary will be at the rate of £700 per annum, in addition to which the person appointed will be granted an allowance of £100 per annum in lieu of residential emoluments. R practitioners holding A or B2 posts and rejected by the R.A.M.C. or otherwise not liable for recruitment to His Majesty's Forces may also apply.

Applications on forms to be obtained from the Public Assistance Officer, Shire Hall, Warwick, should on completion be returned to him, together with copies of three recent testimonials, not later than Friday, the 25th September, 1942.

L. EDGAR STEPHENS, Clerk of the Council.

Shire Hall, Warwick, 7th September, 1942.

Leeds Public Dispensary and HOSPITAL.

Applications are invited from registered medical practitioners for the following resident posts, vacant about the middle of October:—

RESIDENT SURGICAL OFFICER (B1). Appointment for one year. Salary at the rate of £200 per annum, with residence, board, and laundry. R practitioners holding A or B2 posts and rejected by the R.A.M.C. may also apply.

Two HOUSE PHYSICIANS (A). Appointment for six months. Salary at the rate of £150 per annum, with residence, board, and laundry. Practitioners within three months of qualification and liable under the National Service Acts, 1939–41, may also apply.

Applications, stating age, nationality, and qualifications, and accompanied by three recent testimonials, to be sent immediately to: CHARLES F. J. MAURY, Secretary and Superintendent.

Lancashire County Council.

BIDDULPH GRANGE ORTHOPÆDIC HOSPITAL.

Applications are invited from registered medical practitioners, Male or Female, for the appointment of RESIDENT JUNIOR HOUSE SURGEON (B2), now vacant. The salary is at the rate of £250 per annum, with full residential emoluments. Practitioners qualified more than three months and liable under the National Service Acts, 1939–41 (males must be rejected by the R.A.M.C.), may also apply when appointment will be limited to six months; otherwise not exceeding twelve months. Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of two recent testimonials, should be sent to Dr. F. Hall, School Medical and Child Welfare Department, County Offices, Preston, not later than the 26th September.

GEORGE ETHERTON, Clerk of the County Council.

County Offices, Preston, 11th September, 1942.

Royal Sussex County Hospital, BRIGHTON. (375 Beds.)

Applications are invited from registered medical practitioners (Male) for the following appointments:—

HOUSE SURGEON (A), vacant about 25th October, 1942. Salary is at the rate of £150 per annum, with full residential emoluments. Practitioners within three months of qualification and liable under the National Service Acts, 1939–41, may also apply when appointment will be for six months; otherwise for at least six months.

HOUSE PHYSICIAN (B2), vacant on the 31st October next. The salary is at the rate of £150 per annum, with full residential emoluments. Practitioners qualified more than three months, liable under the National Service Acts, 1939–41, and rejected by the R.A.M.C. may also apply when appointment will be limited to six months; otherwise it will be for at least six months.

Applications, stating age, nationality, qualifications, and accompanied by copies of testimonials, to—

L. L. W. LANCASTER-GAYE, Secretary-Superintendent.

Southport General Infirmary. (267 Beds.)

Whole-time SURGICAL OFFICER (B1) (Temporary) required primarily to perform the duties of members of the surgical staff serving with His Majesty's Forces. Salary £550 per annum resident, or £700 per annum non-resident. Candidates must have a higher surgical degree or diploma, recent experience in major surgery, and should be exempt from military service. R practitioners holding A or B2 posts and rejected by the R.A.M.C. may also apply.

Applications, with copies of three recent testimonials, should be forwarded to the SUPERINTENDENT AND SECRETARY, The Southport General Infirmary, Southport, Lancashire, not later than Saturday, 3rd October, 1942, from whom further particulars may be obtained.

West Suffolk General Hospital, BURY ST. EDMUNDS. (427 Beds.)

Applications are invited from registered medical practitioners for the appointment of HOUSE SURGEON (B2) to take charge of M.S. beds, for general and traumatic surgery. Experience in anæsthetics essential. Salary, with full residential emoluments, will be at the rate of £200 per annum. Practitioners qualified more than three months and liable under the National Service Acts, 1939–41 (males must be rejected by the R.A.M.C.), may also apply when appointment will be limited to six months; otherwise it will be for six months with a possibility of renewal at the pleasure of the Committee of Management.

Applications, stating age, nationality, qualifications, and accompanied by copies of testimonials, to—

E. E. HARDWICKE, Secretary.

Royal United Hospital, Bath.

Applications are invited from registered medical practitioners (Male) for the following appointments, vacant on 1st October: HOUSE SURGEON (A) (General Surgery and Ear, Nose, and Throat); HOUSE SURGEON (A) (General Surgery). Salary at the rate of £150 per annum, with board, residence, and laundry. Practitioners within three months of qualification and liable under the National Service Acts, 1939–41, may also apply when appointments will be for six months.

Applications (clearly indicating the post desired), stating age, qualifications, and experience, together with a copy of three testimonials, to reach the undersigned at once.

J. LAWRENCE MEARS, Secretary-Superintendent.

5th September, 1942.

Keighley and District Victoria HOSPITAL, YORKSHIRE (WEST RIDING). (194 Beds—2 Residents.)

Applications are invited from registered medical practitioners (Male and Female) for the appointment of SECOND RESIDENT MEDICAL OFFICER (A), vacant 1st October, 1942. Salary £120 per annum, with full residential emoluments. If renewed, salary £140 per annum. Practitioners within three months of qualification and liable under the National Service Acts, 1939–41, may also apply when appointment will be for six months; otherwise for six months renewable.

Applications to be received by the undersigned not later than Monday, 21st September, 1942.

J. YOUNG, Secretary-Superintendent.

Doncaster Royal Infirmary.

Applications are invited from registered medical practitioners for the appointment of RESIDENT SURGICAL OFFICER (B1). Applicants must be unmarried and have had previous surgical experience. Salary will be at the rate of £250 per annum, rising by half-yearly increments of £25. R practitioners holding A or B2 posts may also apply.

Applications, stating age, nationality, qualifications with dates, and experience and details of previous appointments, accompanied by copies of not more than three testimonials, to be sent immediately to—

R. LANCASTER, Secretary-Superintendent.

East Suffolk and Ipswich Hospital. (400 Beds.)

Applications are invited from registered medical practitioners for the appointment of HOUSE SURGEON (A), now vacant. Appointment will be for six months. Salary at the rate of £144 per annum, with full residential emoluments. Practitioners within three months of qualification and liable under the National Service Acts, 1939–41, may also apply.

Applications, stating age, nationality, qualifications, and accompanied by copies of testimonials, to—

ARTHUR GRIFFITHS, Secretary.

The Hospital, Ipswich, 12th September, 1942.

Norfolk and Norwich Hospital, NORWICH.

Applications are invited from registered medical practitioners (Male) for the appointment of HOUSE SURGEON (A). Salary at the rate of £170 per annum, with full residential emoluments. Practitioners within three months of qualification and liable under the National Service Acts, 1939–41, may also apply when appointment will be for six months.

Applications, together with copies of testimonials, should be sent as soon as possible to—

FRANK INCH, House Governor and Secretary.

September, 1942.

City of Manchester.

MONSALL HOSPITAL FOR INFECTIOUS DISEASES.
(600 Beds.)

APPOINTMENT OF JUNIOR RESIDENT ASSISTANT MEDICAL OFFICER (A).

Applications are invited from registered medical practitioners for the above-mentioned post, vacant now, including practitioners within three months of qualification and liable under the National Service Acts, 1939–41, when appointment will be for six months; otherwise not exceeding twelve months. Preference will be given to candidates who have held resident surgical and medical posts in a general hospital. The basic salary for the appointment is £250 per annum or, if held by a practitioner within three months of qualification as above, £125 per annum, with board, residence, and laundry in addition, subject to the Manchester Corporation conditions of service. A temporary cost-of-living wages award is payable in addition to the foregoing salaries.

Full information and forms of application may be obtained from the Medical Officer of Health, Hospitals Administration Section, P.O. Box 399, Town Hall, Manchester, 2, and applications for the post must be received by him not later than 24th September, 1942.

Canvassing in any form is prohibited.

R. H. ADCOCK, Town Clerk.

Town Hall, Manchester, 2, 2nd September, 1942.

County Borough of Middlesbrough.

HEMLINGTON HOSPITAL.

Applications are invited for the appointment of ASSISTANT RESIDENT MEDICAL OFFICER (B2). Practitioners qualified more than three months and liable under the National Service Acts, 1939–41 (males must be rejected by the R.A.M.C.), may also apply when appointment will be limited to six months; otherwise not exceeding twelve months. Salary is at the rate of £300 per annum, together with full residential emoluments. The successful candidate will be required to pass satisfactorily a medical examination.

Applications, accompanied by copies of three recent testimonials, to be sent to the Medical Officer of Health, Health Department, Municipal Buildings, Middlesbrough, not later than Monday, 21st September, 1942.

PRESTON KITCHEN, Town Clerk.

Municipal Buildings, Middlesbrough.

Southend-on-Sea General Hospital.

Applications are invited from Male practitioners for the appointment of HOUSE SURGEON (B2). Salary at the rate of £150 per annum, with full residential emoluments. Practitioners qualified more than three months, liable under the National Service Acts, 1939–41, and rejected by the R.A.M.C. may also apply when appointment is limited to six months.

The post is vacant now and applications, stating nationality and qualifications, with copies of testimonials, should be sent as soon as possible to—

P. H. CONSTABLE, House Governor and Secretary.

Aberystwyth and Cardiganshire GENERAL HOSPITAL.

Applications are invited from registered medical practitioners, Male or Female, for the appointment of RESIDENT HOUSE SURGEON AND ANÆSTHETIST (B1), whose duties will comprise in addition general administrative work, vacant on the 1st October, 1942. Salary at the rate of £350 per annum, plus residential emoluments. R practitioners holding A or B2 posts and rejected by the R.A.M.C. may also apply.

Applications, stating age, qualifications with dates, nationality, and present post, and accompanied by copies of three recent testimonials, should be sent not later than the 23rd September, 1942, to: J. PRICE THOMAS, Secretary.

Cheshire Joint Sanatorium Board, MARKET DRAYTON.

RESIDENT ASSISTANT MEDICAL OFFICER (B1) required for the Cheshire Joint Sanatorium, Market Drayton, Salop. Applicants must be registered medical practitioners (including suitably qualified R practitioners holding A or B2 posts and rejected by the R.A.M.C.) who have held resident appointments in general hospitals and had experience in diagnosis and treatment of tuberculosis. Salary £350 per annum, with board, lodging, and laundry.

Applications, stating age, nationality, qualifications with dates, and details of previous appointments, to the undermentioned. Application forms not provided. Copies of not more than three testimonials.

PETER W. EDWARDS, Medical Superintendent.

Cheshire Joint Sanatorium, Market Drayton, Salop.

Children's Hospital, Nottingham.

Applications are invited for the post of HOUSE PHYSICIAN (B1) (Woman). The salary will be at the rate of £220 per annum, with apartments, board, and laundry. The appointment will be for six months, duties to commence on the 1st November, 1942.

Applications, together with testimonials, stating age, nationality, qualifications, and experience, to be sent to the HONORARY SECRETARY, 1, King John's Chambers, Nottingham, on or before Tuesday, 22nd September, 1942. Selected candidates will be required to attend at the Hospital for a personal interview.

Essex County Council.

ESSEX COUNTY COUNCIL HOSPITAL, BROOMFIELD, Near CHELMSFORD.

Applications are invited from registered medical practitioners for the appointment of JUNIOR RESIDENT MEDICAL OFFICER (B2) at the above Hospital. The salary is at the rate of £250 per annum, with residential emoluments valued at £160 per annum. Practitioners qualified more than three months and liable under the National Service Acts, 1939–41 (males must be rejected by the R.A.M.C.), may also apply when appointment will be limited to six months; otherwise not exceeding twelve months.

Applications on forms to be obtained from the undersigned to be delivered at the County Hall, Chelmsford, not later than 9 A.M. on the 3rd day of October, 1942.

Canvassing, whether directly or indirectly, is forbidden.

JOHN E. LIGHTBURN, Clerk of the County Council.

County Hall, Chelmsford, 1st September, 1942.

Royal Manchester Children's Hospital, PENDLEBURY.

Applications are invited from registered medical practitioners, Male and Female, for the post of ASSISTANT MEDICAL OFFICER (A) at the OUT-PATIENTS' DEPARTMENT, Gartside-street, Manchester. The appointment will be for six months, commencing 1st October, and the salary is at the rate of £150 per annum. The hours of duty at the Out-patients' Department are from 9 A.M. until 1 P.M., or until the work of the department is finished. Practitioners within three months of qualification and liable under the National Service Acts, 1939–41, may also apply.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to the undersigned immediately.

By Order,

H. HEARDMAN, General Superintendent and Secretary.

Royal Berkshire Hospital, Reading.

Applications are invited from registered medical practitioners, Male and Female, for the appointment of RESIDENT SURGICAL OFFICER (B1), now vacant. Applicants should have held house appointments and had surgical experience. Preference will be given to candidates holding diploma of F.R.C.S. Salary is at the rate of £250 per annum, with board, residence, and laundry. R practitioners holding A or B2 posts and rejected by the R.A.M.C. may also apply.

Applications, stating age and experience, with copies of not more than three recent testimonials, to be sent immediately to—

H. E. RYAN, Secretary and House Governor.

The Children's Hospital (KING EDWARD VII MEMORIAL), BIRMINGHAM, 16.

APPOINTMENT OF SURGICAL CASUALTY OFFICER (B1).

Applications are invited from registered medical practitioners for the above appointment, vacant on 1st October, 1942. Applicants must have had surgical experience. Salary is at the rate of £250 per annum, with board, residence, and laundry, and the appointment is tenable for one year. R practitioners holding A or B2 posts and rejected by the R.A.M.C. may also apply.

Applications, stating age, nationality, qualifications with dates, experience, and details of previous appointments, should be sent as soon as possible to—

HAROLD F. SHRIMPTON, House Governor.

4th September, 1942.

Children's Hospital, Sunderland.

(50 Beds in active use.)

Applications are invited from Female registered medical practitioners for the appointment of HOUSE PHYSICIAN (A), or alternatively HOUSE SURGEON (A), for six months from the 13th October, 1942. Salary £150 per annum, with full residential emoluments. Practitioners within three months of qualification and liable under the National Service Acts, 1939–41, may also apply.

Applications, stating age and qualifications, and accompanied by testimonials, to be sent to—

M. J. HUNTLEY, House Governor and Secretary.

County Borough of Blackburn.

LADY ASSISTANT MEDICAL OFFICER OF HEALTH AND ASSISTANT SCHOOL MEDICAL OFFICER.

Applications are invited from duly registered Women practitioners for the above appointment to act under the direction and supervision of the Medical Officer of Health who is also School Medical Officer. Salary £600 per annum, rising by annual increments of £25 to £700 per annum, plus war bonus. In fixing the commencing salary within the scale regard will be had to previous recognised service. The person appointed should have had at least three years' postgraduate experience in the practice of her profession and special experience of practical midwifery and antenatal work. Preference will be given to candidates who hold a registrable degree or diploma in Public Health.

Applications to be made on forms to be obtained from the Medical Officer of Health, Victoria-street, Blackburn, and returned to him by Wednesday, the 30th September, 1942, endorsed "Assistant Medical Officer of Health."

CHAS. S. ROBINSON, Town Clerk.

County Borough of West Bromwich.

ASSISTANT MEDICAL OFFICER OF HEALTH AND ASSISTANT SCHOOL MEDICAL OFFICER.

Applications are invited for the above whole-time appointment. The appointment is temporary for the duration of the war and will be reviewed for permanency thereafter.

Applicants must be registered medical practitioners, preferably holding the D.P.H. and with experience in refractions, and have had at least two years' experience since qualification. The duties will include general public health, school medical work, and any other duties as may be allocated by the Medical Officer of Health, including civil defence. Salary £600 per annum, rising by annual increments of £25 to £700, and a car allowance.

(The post of Deputy Medical Officer will become vacant in the near future.)

Applications, stating qualifications and experience in detail, with three copies of recent testimonials, should be forwarded to the undersigned to arrive not later than 16th September, 1942.

There are no special application forms.

W. S. WALTON, Medical Officer of Health.

Health Department, 2, Lodge-road, West Bromwich,
29th August, 1942.

The Children's Hospital, Sheffield

(INC.) (157 Beds.)

Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE SURGEON (A) vacant 1st October, including practitioners within three months of qualification and liable under the National Service Acts 1939–41, when the appointment will be for a period of six months. Salary is at the rate of £100 per annum with full residential emoluments.

Applications, stating age, nationality, qualifications, and accompanied by copies of three recent testimonials should be sent to the undersigned.

The successful applicant must be a member of a Medical Defence Society.

T. H. G. GARTLAND, Superintendent and Secretary.

County Borough of Burnley.

MUNICIPAL GENERAL HOSPITAL.

Applications are invited from registered medical practitioner for the appointment of SURGICAL OFFICER (B1), vacant on 23rd November, 1942. Applicants should have held house appointments and had surgical experience. Preference will be given to candidates holding the diploma of F.R.C.S. R practitioners holding A or B2 posts and rejected by the R.A.M.C. may also apply. Salary £750 per annum, rising, subject to satisfactory service, by £25 per annum to £850 per annum, plus war bonus of £40 10s. Commencing salary will be fixed according to the qualifications and experience of the successful applicant.

Forms of application and further particulars may be obtained from the Medical Officer of Health, Public Health Department, St. James's Street, Burnley, to whom applications should be returned, duly completed and accompanied by copies of three recent testimonials, not later than Wednesday, 23rd September, 1942.

ARCHIBALD GLEN, Town Clerk.

Town Hall, Burnley, 31st August, 1942.

County Infirmary, Cambridge.

Immediate applications are invited for the appointment of a HOUSE SURGEON (A) at the County Infirmary, Cambridge, a public assistance institution up-graded as a Class I Hospital. Practitioners within three months of qualification and liable under the National Service Acts, 1939–41, may apply when appointment will be for six months; otherwise for twelve months. The total number of beds available is 259; about 200 beds are occupied at the present time. Salary at the rate of £120 per annum, with board, residence, and laundry.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of recent testimonials, should be sent at once to the CLERK of the Cambridgeshire County Council, Shire Hall, Castle Hill, Cambridge.

Shire Hall, Cambridge, 25th August, 1942.

The Robert Jones and Agnes Hunt

ORTHOPÆDIC HOSPITAL, OSWESTRY, SHROPSHIRE.

Applications are invited from registered medical practitioners (Male) for the appointment of a HOUSE SURGEON (A), now vacant, including practitioners within three months of qualification and liable under the National Service Acts, 1939–41, when appointment will be for six months. Salary is at the rate of £200 per annum, with full residential emoluments.

Applications, stating age, nationality, qualifications, &c., with copies of recent testimonials, to be forwarded at once to the SECRETARY-SUPERINTENDENT.

Cheltenham Hospital.

Applications invited from registered medical practitioners for appointment of HOUSE SURGEON (A), vacant immediately, including practitioners within three months of qualification and liable under the National Service Acts, 1939–41, when appointment will be for six months. Salary at rate of £200 per annum, with full residential emoluments.

Applications should be sent immediately to County Medical Officer of Health, 18, Berkeley-street, Gloucester.

RICHARD L. MOON,
Clerk of the Gloucestershire County Council.

Northumberland County Council.

Applications are invited for the post of ASSISTANT COUNTY MEDICAL OFFICER at the scale salary of £500 per annum, rising by annual increments of £25 to £700 per annum. Previous experience in a similar post will be taken into consideration in determining the commencing salary. Travelling and subsistence allowances will be paid in accordance with the Council's scale. The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and the successful candidate will be required to pass a medical examination. The officer appointed must devote the whole of his time to his duties and may be required to undertake any duties in the Health Department, including work in connexion with the Civil Defence Services and with the care of mental defectives.

Forms of application may be obtained from the undersigned, and applications should be received not later than 21st September, 1942. C. HAROLD CARTER, Clerk of the County Council.

New Senior School, Mitford-road, Morpeth, Northumberland.

City of Portsmouth.

SAINT MARY'S HOSPITAL. (1050 Beds.)

Applications are invited from Male registered medical practitioners for the appointments of Two JUNIOR RESIDENT MEDICAL OFFICERS (A posts), vacant shortly, including practitioners within three months of qualification and liable under the National Service Acts, 1939–41, when appointments will be for six months; otherwise for twelve months. The salary is at the rate of £250 per annum, with full residential emoluments valued at £125 per annum, and a temporary cost-of-living bonus, according to the Whitley Council Scale, at present at the rate of 6s. 6d. per week.

Application forms may be obtained from, and must be returned to, the Medical Officer of Health, Northern Secondary School, Mayfield-road, Portsmouth.

F. J. SPARKS, Town Clerk.

Municipal Offices, Royal Beach Hotel, Southsea,
28th August, 1942.

The Bolton Royal Infirmary.

(245 Beds.)

Applications are invited from registered medical practitioners, Male and Female, for the following appointments vacant on 30th September, 1942.

HOUSE PHYSICIAN (B2). Practitioners qualified more than three months and liable under the National Service Acts, 1939–41 (males must be rejected by the R.A.M.C.) may also apply, when appointment will be limited to six months. Salary £200 per annum, with full residential emoluments.

HOUSE SURGEON (A) mainly in charge of Gynæcological and Ear, Nose and Throat Departments, including practitioners within three months of qualification and liable under the National Service Acts, 1939–41, when appointment will be for six months. Salary £150 per annum, with full residential emoluments.

Applications, stating age, nationality and experience, together with copies of testimonials, to be forwarded to the undersigned immediately.

H. CORLESS, Deputy Superintendent Secretary.

University of Birmingham.

The Council invites applications from registered medical practitioners (Male) for the post of MEDICAL OFFICER to the University, the appointment to be taken up on 1st October, 1942. Salary £750 per annum. The Medical Officer will be responsible for the medical examination of undergraduates in the University and will act as Medical Adviser to the Physical Education Department. He will be expected to undertake research work arising from these duties.

Further particulars of the appointment may be obtained from the undersigned, to whom applications (three copies) must be submitted, with the names of three referees, immediately.

C. G. BURTON, Secretary.

The University, Edmund-street, Birmingham, 3,
August, 1942.

Bedford County Hospital.

Applications are invited from registered medical practitioners, Male and Female, for the appointment of a HOUSE SURGEON (A), vacant approximately the 1st October, including practitioners within three months of qualification and liable under the National Service Acts, 1939–41, when appointment will be limited to six months. The salary is at the rate of £150 per annum, with full residential emoluments.

Applications, stating age, nationality, qualifications, and accompanied by copies of testimonials, to the SECRETARY.

Royal Infirmary, Bradford.

Applications are invited from registered medical practitioners (Male, single) for the appointment of HOUSE SURGEON (B2), vacant on 31st October. Practitioners qualified more than three months and liable under the National Service Acts, 1939–41, cannot be considered unless rejected by the R.A.M.C. Six months' appointment. Salary £150 per annum, with full residential emoluments. There are 345 Beds and eight Resident Officers.

Applications, stating age, nationality, qualifications, and previous experience, with copies of three recent testimonials, should be sent immediately to—

H. TRUSSON, House Governor and Secretary.

26th August, 1942.

Royal Berkshire Hospital, Reading.

The Board of Management invites applications from medical practitioners, engaged exclusively in the practice of physical medicine, for the post of HONORARY PHYSICIAN in charge of the ELECTROTHERAPEUTIC AND MASSAGE DEPARTMENT. Candidates must be medical graduates of one of the universities of the British Empire and their names entered on the Medical Register. The appointment is temporary and is terminable within twelve months of the conclusion of hostilities. The elected candidate will be appointed for the period ending on the third Tuesday in January, 1943, and will be eligible for re-election.

Canvassing on the part of a candidate or on his behalf will disqualify him. The person appointed will not be required to live in Reading.

Candidates are required to provide six copies of their application and testimonials, which must be addressed to the Secretary and reach him not later than 9 A.M. on Friday, 25th September, 1942. The election will be held on 6th October, 1942.

By Order,
H. E. RYAN, Secretary and House Governor.

West Suffolk General Hospital,

BURY ST. EDMUNDS. (415 Beds.)

Applications are invited from registered medical practitioners, Male or Female, for the following A appointments, including practitioners within three months of qualification and liable under the National Service Acts, 1939–41, when appointments will be for six months :—

HOUSE PHYSICIAN, vacant on 1st October. Salary is at the rate of £150 per annum, with full residential emoluments.

HOUSE SURGEON AND RESIDENT OBSTETRICIAN, vacant on 26th September. Salary is at the rate of £150 per annum, with full residential emoluments.

Applications, stating age, experience, qualifications, and nationality, should be sent, accompanied by copies of three recent testimonials to: E. E. HARDWICKE, Secretary.

29th August, 1942.

Nottingham City Council.

FIRS MATERNITY HOSPITAL. (40 Beds.)

Applications are invited from registered medical practitioners, Male, for the appointment of RESIDENT OBSTETRIC HOUSE SURGEON (B2), vacant towards the end of September. Salary is at the rate of £300 per annum, with full residential emoluments. Practitioners qualified more than three months and liable under the National Service Acts, 1939–41, but rejected by the R.A.M.C., may also apply, when appointment will be limited to six months, otherwise renewable for a further six months subject to satisfactory service.

Applications, stating age, qualifications with dates, and nationality, should be accompanied by copies of three testimonials and sent forthwith to: J. E. RICHARDS, Town Clerk.

Guildhall, Nottingham, 26th August, 1942.

County Borough of Preston.

SHAROE GREEN HOSPITAL. (250 Beds.)

Applications are invited from registered Women medical practitioners for the appointment of JUNIOR RESIDENT MEDICAL OFFICER (A), including W practitioners within three months of qualification and liable under the National Service Acts, 1939–41, when appointment will be for six months ; otherwise not exceeding twelve months. Salary £150 per annum, with full residential emoluments.

Applications, stating age, nationality, and qualifications with dates, and copies of three recent testimonials, to be forwarded to the MEDICAL SUPERINTENDENT, Sharoe Green Hospital, Fulwood, Preston.

Derbyshire Royal Infirmary, Derby.

(Voluntary Hospital. Total Beds 646.)

Applications are invited from registered medical practitioners (Male and Female) for the appointment of a CASUALTY OFFICER (A), vacant immediately, including practitioners within three months of qualification and liable under the National Service Acts, 1939–41, when appointment will be for six months. Salary is at the rate of £150 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to—

ARTHUR TAYLOR, Superintendent and Secretary.

Heckmondwike and Mirfield Urban

DISTRICT COUNCILS.
COUNTY COUNCIL OF THE WEST RIDING OF YORKSHIRE.

JOINT APPOINTMENT OF MEDICAL OFFICER OF HEALTH AND ASSISTANT COUNTY MEDICAL OFFICER.

Applications are invited from registered medical practitioners holding the Diploma in Public Health, or its equivalent, for the above-named whole-time appointment, subject to the provisions of the Sanitary Officers (Outside London) Regulations, 1935, and the Local Government Act, 1933. The salary attached to the post is £800 per annum, advancing, subject to satisfactory service, by annual increments of £50 to a maximum of £1000 per annum, together with an allowance for travelling expenses of £50 per annum. Office accommodation and any necessary clerical assistance will be provided or, if necessary, an allowance will be made for their provision.

The appointment will be made jointly by the District Councils and the County Council, and the person appointed will not be permitted to engage in private practice and will be required—

(*a*) To reside either in Heckmondwike or Mirfield, or within such distance therefrom as may be approved ;
(*b*) As Medical Officer of Health of the Urban Districts of Heckmondwike and Mirfield to act under the control and direction of the respective District Councils and to perform all the duties imposed on a Medical Officer of Health by the relevant Acts and Orders ;
(*c*) To act as Medical Officer of the Maternity and Child Welfare Services of the Heckmondwike Urban District Council;
(*d*) As Assistant County Medical Officer to act under the direction and control of the County Medical Officer, and to carry out duties relating to school medical examination, medical examination of defectives, and certain maternity and child welfare work, and such other duties on behalf of the County Council as may be deemed necessary from time to time ;
(*e*) To undertake such other duties, not being incompatible with the above, as the Councils may jointly decide upon, and appropriate duties in connexion with Air Raid Precautions.

The appointment will be subject to the provisions of the Local Government Superannuation Act, 1937, and to the successful candidate passing a medical examination as to his physical fitness.

Forms of application may be obtained from either of the undersigned, and completed forms, accompanied by copies of not more than three recent testimonials, must be delivered to Mr. F. L. Parker, Clerk to the Mirfield Urban District Council, Council Offices, Mirfield, not later than 19th September, 1942.

Canvassing of members of the appointing bodies, directly or indirectly, will disqualify any candidate for the appointment.

GEORGE HOLT,
Clerk to the Urban District Council of Heckmondwike.
FRANK L. PARKER,
Clerk to the Urban District Council of Mirfield.

31st August, 1942.

West Cornwall Hospital, Penzance.

(184 Beds.)

Applications are invited from registered medical practitioners, Male and Female, for the appointment of a HOUSE SURGEON (A), to become vacant on the 14th September, 1942, including practitioners within three months of qualification and liable under the National Service Acts, 1939–41, when appointment will be for six months. Salary is at the rate of £150 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to—

K. I. NEWELL, Secretary-Superintendent.

Royal Salop Infirmary, Shrewsbury.

Applications are invited from registered medical practitioners, Male and Female, for the appointment of RESIDENT HOUSE SURGEON (B2), vacant on 12th October. Practitioners qualified more than three months and liable under the National Service Acts, 1939–41 (males must be rejected by the R.A.M.C.), may also apply when appointment will be limited to six months. The salary is at the rate of £160 per annum, with full residential emoluments.

Applications, stating age, nationality, qualifications, and accompanied by copies of testimonials, to—

J. W. NOBLE, Secretary-Superintendent.

Board Room, 25th August, 1942.

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The Medical Defence Union

MUSeum 1337

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Hull Royal Infirmary.

Applications are invited from registered medical practitioners, Male and Female, for the appointment of CASUALTY OFFICER (A), vacant November. Applicants may include practitioners within three months of qualification and liable under the National Service Acts, 1939-41, when appointment will be for six months. Salary is at the rate of £200 per annum, with full residential emoluments.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of recent testimonials, should be addressed to: R. J. CARLESS, House Governor.

De-la-Pole Hospital

(FOR NERVOUS AND MENTAL DISORDERS),
WILLERBY, Near HULL.

Required immediately TEMPORARY MEDICAL OFFICER (B1) (Male or Female) to replace one called up. R practitioners holding A or B2 posts and rejected by the R.A.M.C. may also apply. Salary £8 8s. per week, plus full residential emoluments.

Apply MEDICAL SUPERINTENDENT.

Royal Infirmary, Preston, Lancs.

The Board of Management invite applications for the post of BIOCHEMIST, to work in the DEPARTMENT OF PATHOLOGY under the direction of the Pathologist. Applicants should hold a degree in Natural Science. Salary according to experience (but not less than £300 per annum), with the chance of increments after probation.

Forms of application will be supplied on request to the PATHOLOGIST.

Northampton General Hospital.

(405 Beds.)

Applications are invited immediately from registered medical practitioners for the post of HOUSE SURGEON (A) to the EAR, NOSE, AND THROAT DEPARTMENT, including practitioners within three months of qualification and liable under the National Service Acts, 1939–41, when appointment will be for six months. Salary at the rate of £150 per annum, with board, residence, and laundry.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent as soon as possible to—

GORDON S. STURTRIDGE, M.B., B.S., Superintendent.

4th September, 1942.

St. Paul's Eye Hospital, Liverpool.

(83 Beds.)

Applications are invited from registered medical practitioners (Male or Female) for the appointment of RESIDENT HOUSE SURGEON (B2), to become vacant on 1st October, 1942. Practitioners qualified more than three months and liable under the National Service Acts, 1939–41 (males must be rejected by the R.A.M.C.), may also apply, when appointment is limited to six months; otherwise it will be for six months with possibility of extension. Salary £160 per annum, with board, &c.

Applications, stating age, nationality, qualifications, experience, &c., accompanied by three testimonials, should be sent to the Secretary.

Salisbury General Infirmary.

(Voluntary Hospital—365 Beds.)

Applications are invited from registered medical practitioners, Male and Female, for the appointment of HOUSE PHYSICIAN (B2), vacant on 19th October, 1942. The salary is at the rate of £125 per annum, with full residential emoluments. Practitioners qualified more than three months and liable under the National Service Acts, 1939–41 (males must be rejected by the R.A.M.C.), may also apply when appointment will be limited to six months.

Applications, stating age, nationality, qualifications, and accompanied by copies of testimonials, to—

JOHN WILLIAMS, Superintendent and Secretary.

General Hospital, Nottingham.

(535 Beds.)

Applications are invited from registered medical practitioners, Male and Female, for the appointment of a HOUSE PHYSICIAN (A) as soon as possible. Salary is at the rate of £200 per annum, with full residential emoluments. Practitioners within three months of qualification and liable under the National Service Acts, 1939–41, may also apply when appointment will be for six months.

Applications, stating age, nationality, qualifications, and accompanied by copies of testimonials, to—

HENRY M. STANLEY, House Governor and Secretary.

General Hospital, Nottingham.

(535 Beds.)

Applications are invited from registered medical practitioners, Male and Female, for the appointment of RESIDENT ANÆSTHETIST (B1), vacant shortly. R practitioners holding A or B2 posts and rejected by the R.A.M.C. may also apply. The salary is at the rate of £300 per annum, with full residential emoluments.

Applications, stating age, nationality, qualifications, and accompanied by copies of testimonials, to—

HENRY M. STANLEY, House Governor and Secretary.

Warwickshire County Council.

TEMPORARY ASSISTANT COUNTY MEDICAL OFFICER OF HEALTH.

Applications are invited for the above post from registered Male or Female medical practitioners. The salary scale is £500 per annum, rising by annual increments not exceeding £25 to £700 per annum, but the commencing salary may be fixed above the minimum having regard to the experience and present salary of the candidate. The successful candidate will be required to provide a car for use on county business and will be paid a mileage and subsistence allowance according to scale. Residence in the northern part of the county will be essential.

Applications on forms to be obtained from the County Medical Officer of Health, Shire Hall, Warwick, and accompanied by copies of three recent testimonials, should be received not later than the 23rd September, 1942.

L. EDGAR STEPHENS, Clerk of the Council.

Shire Hall, Warwick, 3rd September, 1942.

Crossley Sanatorium, Kingswood,

Near FRODSHAM.

Applications are invited from registered medical practitioners for the appointment of MEDICAL SUPERINTENDENT of the above Sanatorium (110 Beds). Commencing salary £750 per annum, with excellent modern house and garden. House free of rent and rates. Experience in administration and in the modern treatment of pulmonary tuberculosis, including radiology, essential.

Applications, stating age and full details, with copies of three testimonials, to be sent not later than 28th September, 1942, to: W. HUNT, Secretary.

Manchester Hospital for Consumption, 45, Hardman-street, Manchester, 3.

Surrey County Council.

NETHERNE HOSPITAL, COULSDON.

TWO TEMPORARY ASSISTANT MEDICAL OFFICERS (Male or Female) required:—

One (B1) post £350–£25–£450 per annum, all found, with an extra £50 for D.P.M. R practitioners holding A or B2 posts and rejected by the R.A.M.C. may also apply.

One (A) post £7 7s. per week. Practitioners within three months of qualification and liable under the National Service Acts, 1939–41 may also apply.

Apply with details to MEDICAL SUPERINTENDENT.

Derbyshire Royal Infirmary, Derby.

(Voluntary Hospital—Total Beds 646.)

Applications are invited from registered medical practitioners (Male and Female) for the appointment of a HOUSE PHYSICIAN (B2), vacant immediately. Salary is at the rate of £150 per annum, with full residential emoluments. Practitioners qualified more than three months and liable under the National Service Acts, 1939–41 (males must be rejected by the R.A.M.C.) may also apply, when appointment will be for six months.

Applications, stating age, qualifications with dates, and nationality, and accompanied by copies of three recent testimonials, should be sent to—

ARTHUR TAYLOR, Superintendent and Secretary.

Industrial Medical Officer for pioneer post near Cheltenham; 2000 employees. Salary about £800 per annum. Please give all relative particulars first letter.—Address, No. 915, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Company Secretary, Accountant, General Manager, a sufferer from hæmophilia, requires position if possible in connexion with medical world; in addition to ordinary work would be available for tests.—Address, No. 917, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Receptionist.—Gentlewoman, 35, married, wants Daily Post in London. Used to children, telephone, office work, etc. No objection to light housework.—Address, No. 919, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Resident Patients received in Doctor's Home in Cheshire Town for treatment of high blood pressure, bronchial asthma, arthritis, and depression.—Address, No. 913, THE LANCET Office, 7, Adam-street, Adelphi, London, W.C.2.

Private Home for Early Mental ILLNESS, ideally situated on the Helford River, receives a limited number of patients for care and active treatment. Special department for Insulin Therapy.—Illustrated brochure from RESIDENT PHYSICIAN, Trenython, Mawnan Smith, Cornwall. Telephone: Mawnan Smith 276.

Medical Practice for Sale, Somerset District. Death vacancy. Gross income £4000, 1800 panel. £2250 for quick sale.—NATIONAL MEDICAL AGENCY, 63, Great George-street, Leeds, 1. Tel.: Leeds 21207.

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Lancet (1940), ii. 400.
* *J. Pharmacol.* (1940), 69, 331.

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